

Vasco Caves Regional Preserve

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RESOURCE
MANAGEMENT
PLAN**



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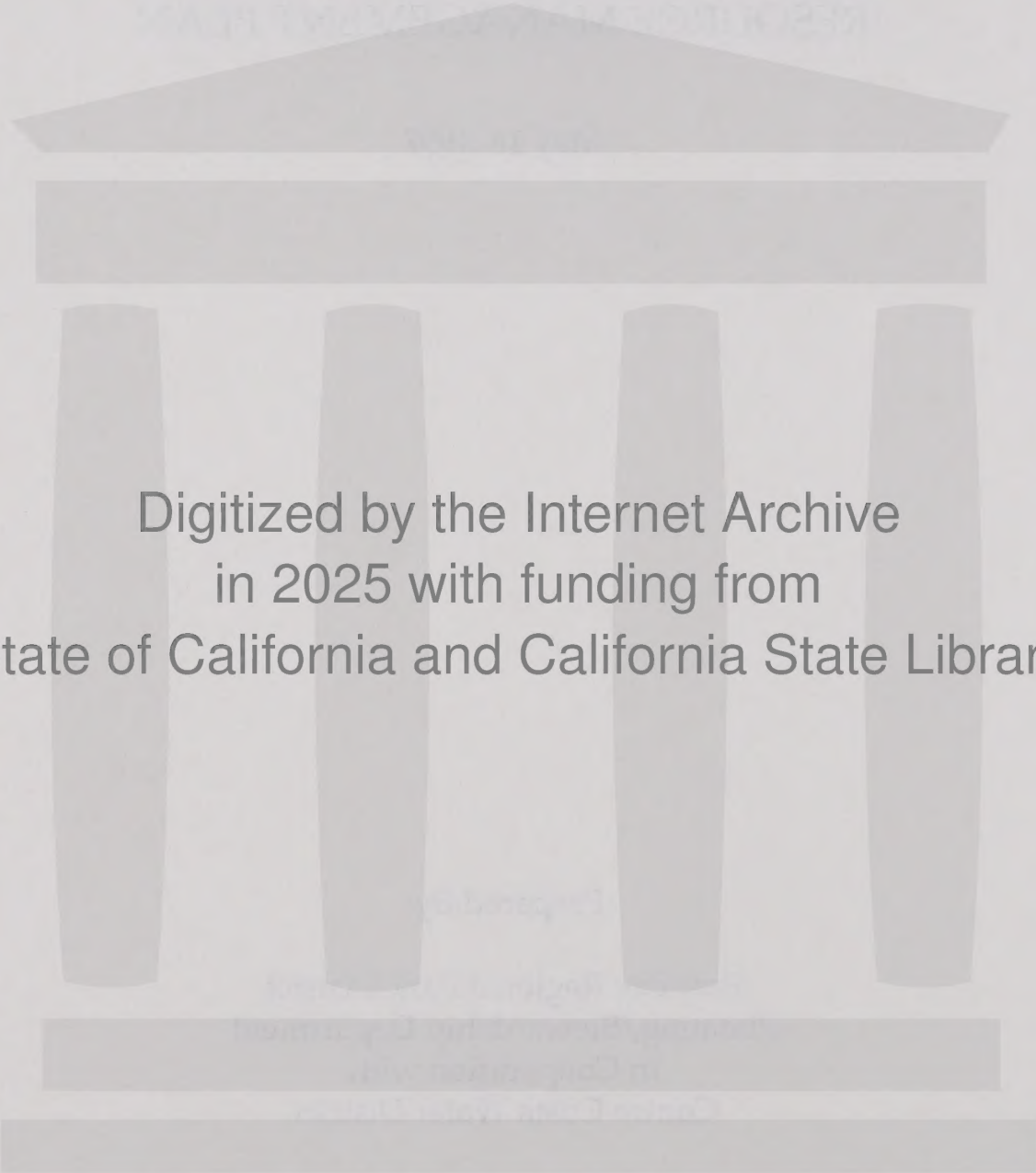
VASCO CAVES REGIONAL PRESERVE
RESOURCE MANAGEMENT PLAN

May 16, 1997

Prepared By:

East Bay Regional Park District
Planning/Stewardship Department
In Cooperation with
Contra Costa Water District

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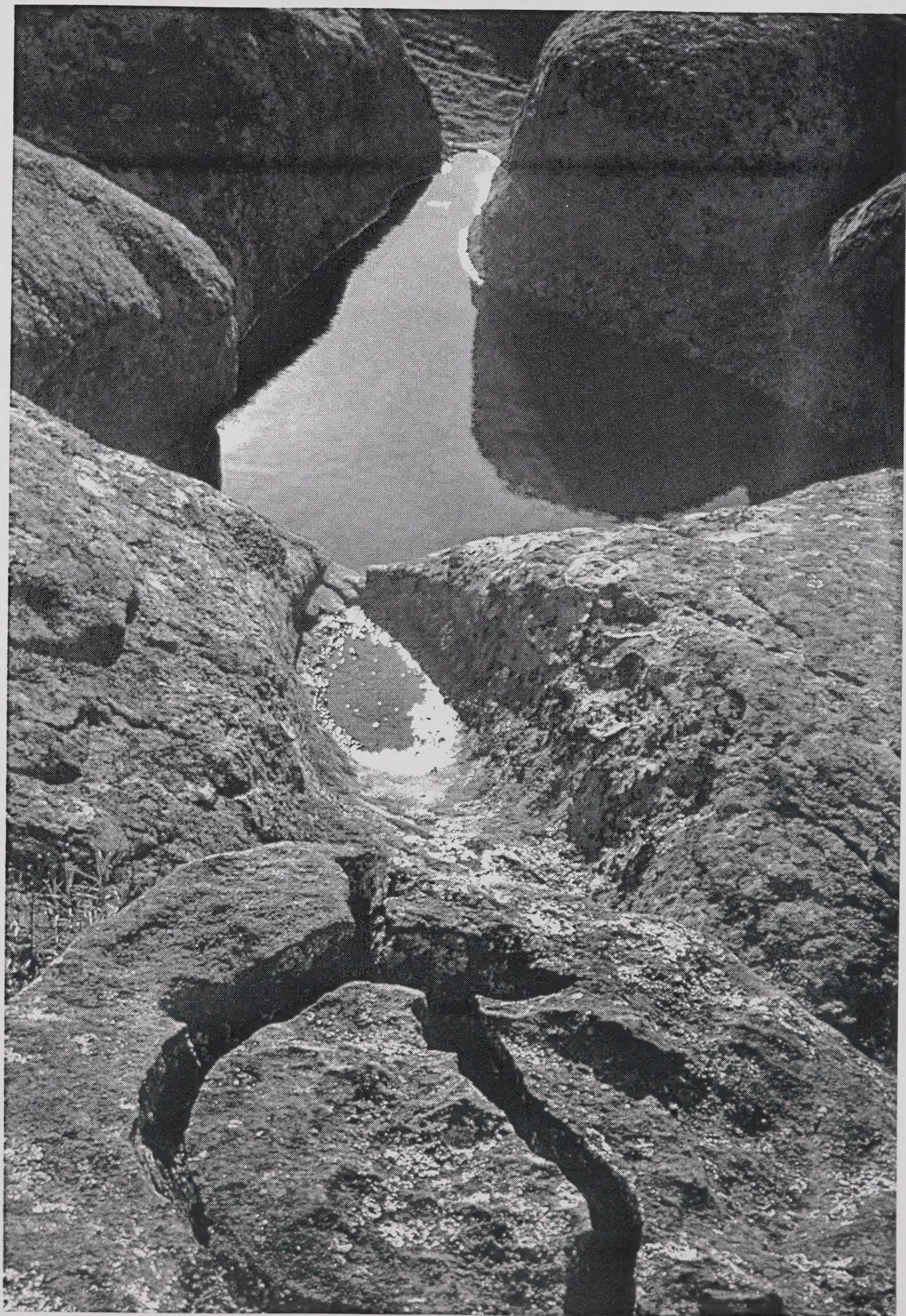
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INTRODUCTION

Vasco Caves Regional Preserve has a breezy, top-of-the-world, feeling to it. The wind lifts eagles above the surrounding hills and drives dozens of windmills that line the easternmost ridges of the Diablo Range like gyrating sentinels standing watch over this remarkable site. To the north one can glimpse part of the Delta with its maze of meandering sloughs. Far to the east are the peaks of the Sierra. Stretching for miles and miles between Mount Diablo and the Sierra is the Central Valley. Vasco Caves lies at the very eastern edge of what we call the "Bay Area," bordering the watery rim of the Delta and the immense flat spaces of the northern Central Valley.

These three distinct regions, the Delta, the Central Valley, and the Bay Area were inhabited by different plants, different animals, and people of several linguistic tribes. A web of ancient trade routes (including what is now Altamont Pass) connected the diverse cultures of peoples whose languages and ways of life were varied, much as those of the contemporary Bay Area. Drawn to the rock shelters, abundant bird life, and exceptional views from Vasco Caves, the Ohlones of the San Francisco Bay Area, the Bay Miwoks of the Diablo Valley, and the Northern Valley Yokuts people may have journeyed to this site for social and ceremonial events. Evidence of their cultural exchanges exist in the many rock paintings that have withstood the pressures of time. These silent remnants of the past are thought to express the relationship that these original inhabitants had with the land.

The rocks and boulders scattered throughout the preserve not only house unique cultural resources but they also support many life forms. Brilliant lichens and mosses cling to rock surfaces. Eagles and owls nest and roost in sheltered crevices. Amphibians live in moist soils under the rocks and delicate, rare fairy shrimp complete their life cycle in small hollows that perforate the rock outcrops, filling with rainwater each winter.

This special site with its unique cultural and natural history qualifies Vasco Caves as a Regional Preserve.

A Regional Preserve

Vasco Caves Regional Preserve is an extraordinary park. Its primary resources are the unusual rock formations, the thriving bird life, and the rock paintings. These essential features, under the East Bay Regional Park District Master Plan, *"are protected for their intrinsic value as well as for the enjoyment and education of the public."* The Master Plan also states:

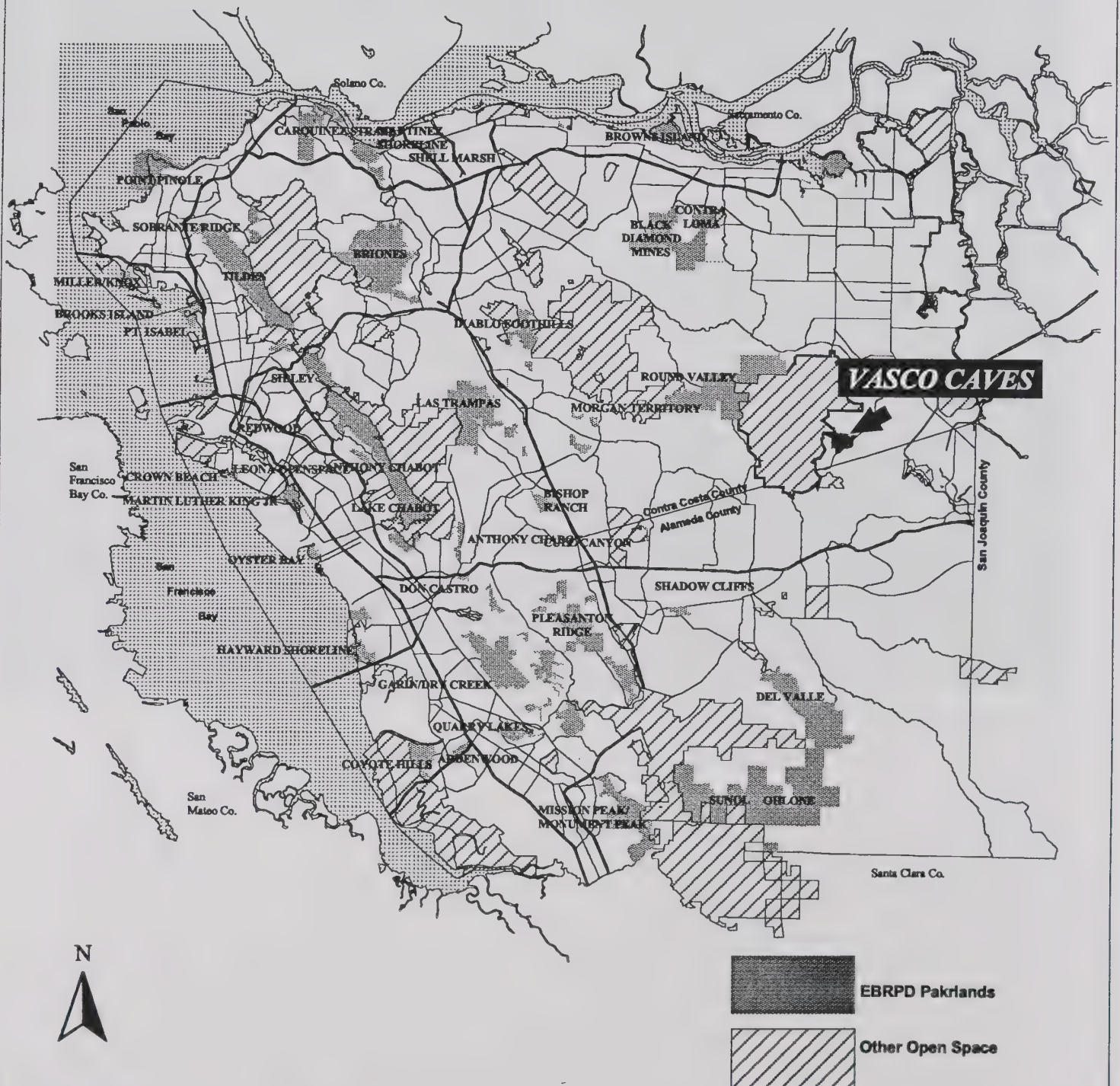
"The primary objective of a Regional Preserve is to preserve and protect significant natural or cultural resources. A Regional Preserve must have great natural importance or be of such significant regional cultural value as to warrant preservation."

Vasco Caves Regional Preserve exists because of the combined efforts of the East Bay Regional Park District (EBRPD) and the Contra Costa Water District (CCWD). A 1995 agreement unites the water district and the park district in the acquisition, protection, and planning of Vasco Caves. The agreement calls for the preparation of a Resource Management Plan to address the issues of resource protection, public access, resource interpretation, and public safety requirements. A long term operating agreement between the two districts will be established for operating Vasco Caves. This Resource Management Plan has been prepared in accord with this agreement. If the plan needs to be changed, CCWD and EBRPD will coordinate and approve the amendment. The plan includes a plan summary and preserve description in Section I. Section II provides background information about the preserve's natural and cultural resources, as well as a description of existing access and circulation. Section III includes recommendations for public access, a trail system, trail names, and actions needed for resource protection.

Long term mitigation requirements for which CCWD is responsible are part of the Los Vaqueros Dam and Reservoir Project (LVP). The primary requirement is to secure the area to protect significant cultural resources values and fairy shrimp habitat. This measure results from the caves' proximity to the newly realigned Vasco Road. CCWD assisted in the purchase of the Vasco Caves site to meet this environmental protection requirement. Because of this acquisition, CCWD has decided to implement a small portion of its requirement to enhance habitat for the San Joaquin kit fox on 169 acres of suitable habitat located within the area. Specific mitigation measures are identified in the plan recommendations and in Appendix G.



Vasco Caves



Location Map **VASCO CAVES REGIONAL PRESERVE** **Resource Management Plan**

Prepared by EBRPD - Planning/Stewardship Department 2950 Peralta Oaks Court, P.O. Box 5381, Oakland, CA 94605 May 16, 1997

Figure 1

I. PLAN SUMMARY

Project Description

The 723-acre Vasco Caves Regional Preserve is located approximately 4 miles southwest of Byron, California, and about 1 mile north of the Alameda/Contra Costa county border (see Figures 1, 2). The easternmost hills of the Diablo Range meet the Central Valley and the San Joaquin River Delta a few miles to the east of the site. This triangular shaped parkland is surrounded by the Contra Costa Water District Los Vaqueros watershed lands to the northwest, Howden Wind Farm to the northeast and privately owned rangeland to the south.



Vasco Caves

Vasco Caves lies within the border zone of two distinct geographic provinces, the Coast Range and the Central Valley. The preserve's landscape is characterized by a distinct group of sandstone outcrops that cut across the hills for several miles. The sandstone outcrops contain wind eroded caves that provided seasonal shelter for the Native American inhabitants of the area.

Elevations in the preserve range from 600 to 1,000 feet. At the top of the tallest peak is a stand of Palmer oaks, a species primarily found south of San Luis Obispo. This distinctive hill can be seen from Mount Diablo in the west, Brushy Peak in the south, and the Central Valley in the east. Other vegetation communities at Vasco Caves include grasslands and scattered groves of valley oaks and buckeyes growing near the rock outcrops. A perennial spring in the center of the preserve flows into several seasonal tributaries of Brushy Creek.

Plan Concept

Vasco Caves is a place where the wind shapes the stone caves and benefits the high concentration of eagles and falcons that live amongst the rock outcrops. Vasco Caves is a place where Native Americans maintained their spiritual roots. It was a place of prayer and ceremony, a spiritual center. Vasco Caves is a place of extraordinary resources, a place of wonder. **Protecting these unique resources is the primary goal of this plan.**

Vasco Caves provides tremendous opportunities for resource appreciation and education. **Developing public access and interpretive programs is the secondary goal of the plan.** This plan will emphasize the conservation of natural and cultural features at Vasco Caves to ensure public enjoyment of this special parkland. Interpretive programs will be established, and developed facilities will be minimal. Public access will be regulated through reservations and special use permits.

The following actions are recommended to meet the plan's goals of resource protection and public access.

Recommended Actions

Resource Management

Both Districts have identified management strategies to maintain viable wildlife populations within balanced ecosystems. Management prescriptions will be implemented to maintain or increase population levels of rare, threatened, and endangered species. Restricted livestock grazing will continue within the park as a fire prevention and resource management tool. Cultural resources will be monitored for human impacts, livestock grazing and weathering. Specific rock outcrops will be designated for interpretive visits. Protective measures will be taken at more sensitive, restricted sites.



Rock outcrops of Vasco Caves

Public Access

Public access will be provided at a graveled staging area large enough for 25 - 35 cars, a bus turnaround and a restroom. This will provide a starting point for the interpretive trail.

Trails

Interpretive and regional trail routes will be established on existing unimproved ranch roads. Existing unimproved roads that are not part of the proposed trail system will not be maintained and will be signed as closed to the public. Names for trails will be based on natural, topographic, and historic features of the park.

Interpretive Programs

Educational programs will be developed to provide for the interpretation of the wildlife of the preserve, the Native American culture and use of the caves area, and local ranching history. Supervised tours of the preserve will be provided for groups limited to 25-35 visitors on a reservation only basis.

Site Security

Boundary, trail name, directional, and regulation signs will be installed to direct and inform park visitors, and to prevent trespass onto private property. Gates will be installed at locations where fire and maintenance roads intersect the parkland. Permanent security options will be evaluated after the preserve has been open for public access.

II. EXISTING CONDITIONS

A. Natural Resources

The following descriptions are a summary of the natural and cultural resources in the preserve with special emphasis on special-status plant and animal species. These are plant or wildlife species that are listed as rare, threatened or endangered (RTE), or are candidates for listing as RTE by state and federal resource agencies. These species have varying degrees of legal protection under the California and Federal Endangered Species Acts and the California Environmental Quality Act.

The following descriptions are a result of surveys conducted by District biologists during spring and summer 1996. Research on animal and plant populations will continue as part of ongoing wildlife and vegetation management at the park.

Plant Communities

The 723 acre Vasco Caves Regional Preserve primarily consists of non-native annual grassland, with scattered groves of valley oak woodland, and localized, wetland areas. The rock outcrops support pockets of grass, herb and shrub growth. The major plant communities are discussed below by their series designations consistent with A Manual of California Vegetation (Sawyer and Keeler-Wolf, 1995).

California Annual Grassland

The California Annual Grassland is a community of herbaceous vegetation composed of native and non-native annual and perennial grasses and herbs. The grassland flora can vary from little more than a dominant cover of non-native grasses, to a diverse mixture of native and non-native grasses and wildflowers. Plant composition differs widely from location to location, depending on individual site factors, the timing and amount of rainfall during the growing season, and past and current land use practices.

Non-native grasses, which were inadvertently introduced to California by early settlers, are a major component of the annual grassland flora at Vasco Caves Regional Preserve. These plants are well-represented on the property and include wild oats, soft chess, ripgut brome, annual ryegrass, wild barley, foxtail chess, red brome, silver hairgrass, and annual bluegrass.

The grasslands are dominated by annual ryegrass, wild oats, soft chess, and/or ripgut brome, with the other grasses occurring in lesser amounts. Native grasses occur widely scattered in some areas, and are absent in others. Creeping wildrye, purple needlegrass, and one-sided bluegrass are the three most common native,

perennial grasses occurring on the Preserve. Interspersed among the native and non-native grasses are several species of native and non-native wildflowers.

Valley Oak/Buckeye Woodland/Savanna

This plant community is dominated by valley oak and occurs as isolated groves or scattered trees. California buckeye is frequently associated with the valley oak. The understory vegetation is similar to that of the annual grassland, but denser groves may contain more herbs and shrubs.

Palmer Oak Woodland

A lone stand of Palmer oak, *Quercus palmeri*, occurs on a 1,022 foot hill, which is the highest elevation on the Preserve. This stand is the northernmost population of Palmer oak in California. Palmer oak is otherwise associated with chaparral communities in southern and central California.

Shrubland

Shrub growth is generally sparse and, where present, tends to occur in the drainages and around the rock outcrops. Due to the limited distribution of shrubland on the Preserve, no area containing shrub growth was large enough to warrant mapping. The common shrubs on the property include coyote brush, California sagebrush, matchweed, poison oak, bush monkeyflower, blue witch nightshade, and blue elderberry.

Riparian Woodland

Riparian woodland vegetation, consisting of moisture-dependent grasses and grasslike plants, herbs, shrubs, and trees, occurs along Brushy Creek. This creek contains running water well into the summer and possibly year-round. Tree cover along the banks is sporadic and consists of willow, buckeye, hop tree, California bay laurel, and an occasional cottonwood. The plant association in the drainage itself is classified as a Sedge Series, and is found sporadically along the streamcourse. Typical herbaceous wetland plants found in and along Brushy Creek include sedge, rush, rabbitsfoot grass, watercress, hedge nettle, curly dock, monkey flower, and loosestrife. A small drainage containing a willow/elderberry riparian plant association exists below the first set of rock outcrops north of Vasco Road near the south boundary of the Preserve. Herbaceous vegetation within this drainage is similar to that found in Brushy Creek.

Freshwater Marsh and Other Wetlands

Wetlands include stock-watering ponds, and localized wet areas associated with springs where underlying geologic features provide an outlet for water to reach the surface. Three ponds occur along Brushy Creek and a fourth, spring-fed pond exists outside the west boundary of the property. A wetland extends along a spring-fed drainage below the latter pond and supports freshwater marsh vegetation. This wetland area is being trampled by livestock and should be afforded protection and managed under a different grazing regime that involves periods of rest during critical growth stages of the vegetation. The ponds along Brushy Creek are used by cattle periodically and are otherwise in good condition with vegetation established along the banks.

Rock Outcrop Flora

Bryophytes (mosses, liverworts and hornworts) are relatively small plants which lack true stems, true leaves and true roots. They grow on soil, tree bark, and rock outcrops. Two unusual species of bryophytes have been discovered at nearby Brushy Peak, one of which grows on soil and the other on rock outcrops (CNPS survey by Daniel Norris, 3/11/96). These species may also be present at Vasco Caves. A one day survey for bryophytes and lichens was conducted on 3/19/97 and species lists are included in the Appendix. No unusual species were discovered on the preserve as a result of this survey. Should subsequent surveys reveal the presence of unusual bryophyte and/or lichen species, potential impacts to these plants will be evaluated. If necessary, modifications in the recommended management prescriptions for the preserve would be developed and incorporated into the plan.

Rare, Threatened and Endangered Plants

The California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California, 5th edition (Skinner and Pavlik 1994), and the CNPS Electronic Inventory were reviewed to determine which plants have the potential to occur on the site. A summary of these species is attached. A search was completed of the California Natural Diversity Database (NDDDB 1995) to determine if any special status plants or natural communities had been reported in the area. The results indicated that no known rare, threatened, or endangered plants occurred on the Preserve. None were located during initial field inspections. The northernmost population of Palmer oak that occurs on the Preserve warrants recognition and protection. Subsequent surveys will determine whether any special status plants exist in the area.

Rangeland Vegetation Management

The Vasco Caves Regional Preserve was formed from two, major, private land acquisitions: the Walker and Souza properties. Grazing has occurred for over a century on what is now the preserve, and on surrounding private land. Other land in the area was settled and extensively farmed, with many of the gentler hills cultivated for dry farming of grain crops. Native plants are generally reduced or eliminated in farmed areas as a result of the continued cultivation of the soil. Repeated, long-term overgrazing will also diminish plant diversity. At present, overall livestock use exceeds accepted range management standards due to the absence of boundary fencing, which provides cattle with unrestricted, year-round access to the preserve from adjacent private land.



Range Analysis

A range analysis was prepared to identify areas within the preserve that were suitable for grazing and to provide an estimate of the forage production and carrying capacity of these areas consistent with resource conservation objectives. The amount of land considered suitable for grazing depended upon its accessibility, terrain, vegetation density, availability of and distance to water, resource sensitivity,

and land management concerns. Plant communities or other locations affording little or no forage for livestock were subtracted from the total acreage of the preserve. Wetland areas were identified that were recommended for protection from continuous livestock grazing. Grazing impacts to rock surfaces and caves, rock art and sandstone basins were assessed. The land identified as suitable for grazing, therefore, amounted to less than the total acreage, and the livestock carrying capacity of the area was adjusted to reflect existing conditions.

Fencing

The extent of grazing activity on the preserve is currently determined by the location, presence or absence of fencing. A new fence along Vasco Road roughly parallels the south-southeastern boundary. There is no fencing along the north, northwest, east, and extreme southwest boundaries of the preserve, which allows livestock access to public land from adjacent private property. Existing fencing conforms to the old northwest boundary of the Walker property, and the northwest corner of the old Souza property. This fencing configuration provides Walker Ranch cattle with access to the far northwest and southeast half of the preserve, and Souza Ranch cattle with access to most of the northern and southwestern portions of the Preserve. Both the combined public and private land is grazed on a year-round basis, because, due to the absence of boundary fencing, there is presently no way to control this use. The overall condition of the fencing on the property (excluding the new fence along Vasco Road) is fair to poor, although mostly functional. Much of it is comprised of alternating iron pickets and charred wood posts. Some short sections have been newly constructed, rebuilt or repaired.

Water

A portion of Brushy Creek flows along the southern boundary of the preserve. This section of the creek supports three ponds. A spring-fed pond also occurs in the northwest corner of the preserve. There are two developed springs used to water livestock. One exists in the center of the preserve and includes a spring box and circular, cement trough. The other occurs in a drainage below a pond in the northwest corner of the preserve, and is in disrepair. The intermittent springs along the drainage and overflow from the trough has given rise to a wetland plant community in the drainage. Numerous depressions and potholes among the rock outcrops contain water in the winter and spring months and support fairy shrimp. None of these areas appear to be adversely impacted by livestock. The fact that the fairy shrimp have continued to survive in association with or despite long-term grazing in the area suggests that any management approach should take this into consideration.

Wildlife

The habitat of Vasco Caves is primarily sandstone rock outcrops surrounded by open expanses of annual (introduced European) grasses, with some scattered pockets of oaks and California buckeyes. As the main substrate in the vicinity, the rock outcrops serve as a focus for nesting birds and denning mammals. Additionally, shallow depressions in these rocks capture winter rainwater and are the primary habitat for several species of freshwater shrimp and tree frogs. The climate at the park is arid and temperatures commonly exceed 100 degrees Fahrenheit in the summer months.

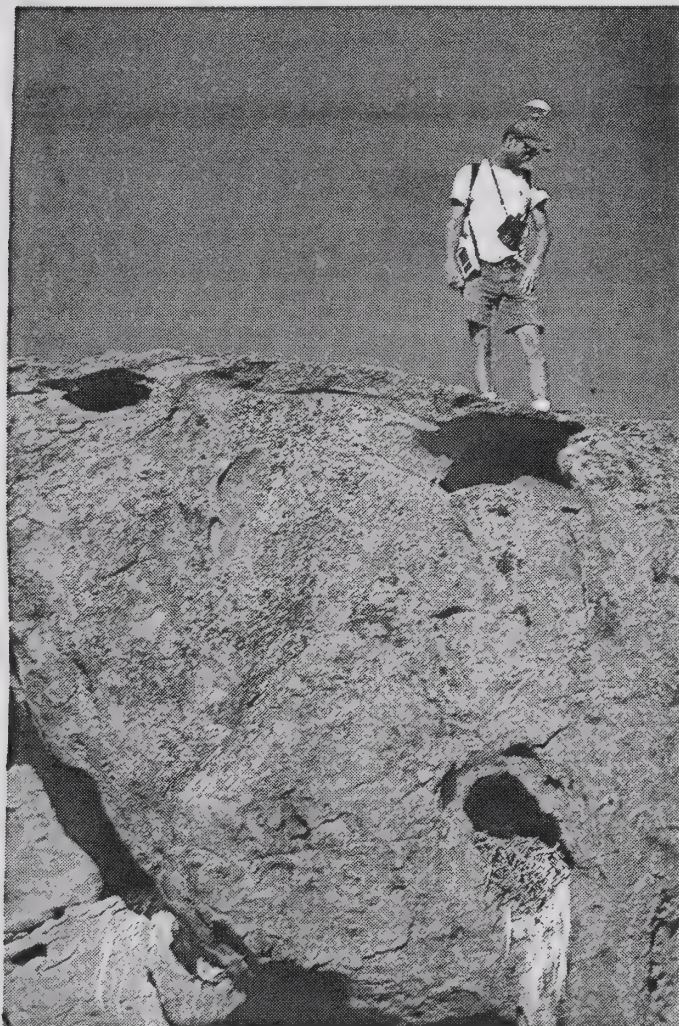
Field surveys were conducted in Vasco Caves on six occasions between October 1995 and July 1996. Habitats in the park were evaluated, based on the Wildlife Habitat Relationship database (WHR) developed by the California Department of Fish and Game (CDFG), for threatened and endangered (TE) species. Refer to Appendix E for a complete list of species noted in the park. Several sources were searched for additional information related to species using the area. These included the California Natural Diversity Database (CNDDDB-CDFG), recent consultant reports (Jones and Stokes, 1990-96) from nearby projects and the Los Vaqueros biological surveys by CDFG (1983).

The wildlife at Vasco Caves is typical of that found in the East Bay Area and also represents species which are more common to the Central valley. There are several mammals including the San Joaquin kit fox, (a state threatened and federally endangered species), coyotes, Audubon's or desert cottontails and numerous California ground squirrels.

Additionally, the park is home to many birds including: golden eagles; red-tailed hawks; burrowing, barn and great-horned owls; towhees; quail and wrens. The seasonal pools or



Barn Owl



Wildlife biologist monitoring owl's nest

"tanks" in the rock outcrops are a unique micro environment occupied by several species of fairy shrimp. These tiny animals expend an entire life cycle in one season, growing from dormant eggs into egg-laying adults. As the summer heat evaporates the pools, the eggs sink to the bottom where they remain until the next seasonal rains.

There are three permanent ponds on the property which were surveyed for fish and amphibians on July 23, 1996. Two of the three ponds nearest Vasco Road contained only fish (bluegill, hitch and mosquito fish), while pond #1, the pond farthest east contained adult California red-legged frogs, a federally threatened species. Pond four drainage, located near the western boundary of the property contained California red-legged frogs and California tiger salamanders in all age classes.

There is a golden eagle nest in one of the rock outcrops in the northwestern portion of the property. Although it is still intact, it is currently occupied by

nesting great-horned owls. At least three eagles have been seen in the preserve during the breeding season, two of which are juvenile birds, suggesting a probable site fidelity by a nesting pair and its young. There is also an eagle roost site located in the valley oaks, directly above the round cement spring box at the head of the main valley drainage. Based on the number of eagles counted and the associated whitewash and molted feathers, this site has been used for several years. These eagles are protected as a State "Fully Protected species", and by the United States Fish & Wildlife Service (USFWS) under the "Bald Eagle Protection Act". Golden eagles feed almost exclusively on the California ground squirrel and are highly susceptible to secondary poisoning from commonly used rodenticides. Burrowing owls, a state "Species of Special Concern" utilize the burrows of ground squirrels for nesting and roosting and forage on insects and rodents as their primary prey. Burrowing owl colonies are scattered across the property with the highest concentrations located in the northeastern half of the preserve. Barn owls nest in high numbers (>6 nests) in the rock outcrops on the property and, based on pellet analysis, have been feeding on several species of nocturnal rodents.

The San Joaquin kit fox's range includes Vasco Caves. This species coexists with ground squirrels on which it relies for food and burrow system development. Although no kit foxes were sited during the July 1996 field surveys, records from the (CNDDDB) confirm prior presence on the site. This species is susceptible to secondary poisoning, predation by coyotes, red foxes and dogs, and introduced canine diseases (distemper, rabies, parasites), and may occasionally be taken as prey by golden eagles (Dr. Pamela Swift, CDFG, 1996).

Sensitive Wildlife

The California Natural Diversity Database (CNDD) and Jones and Stokes, 1990-96 Los Vaqueros biological surveys were reviewed to determine which sensitive species occur at Vasco Caves. Field surveys during 1996 were conducted to identify these species. Based on field surveys and data from the CNDDDB the following sensitive species occur at the site: San Joaquin kit fox a State Threatened and Federally Endangered species; California red-legged frog a Federally Threatened and a State Species of Special Concern; California tiger salamander a State Species of Special Concern and a Federal Species of Concern; golden eagle a Species of Special Concern, a California Fully Protected Species, also protected under the Federal "Bald Eagle Protection Act"; Ferruginous hawk (wintering) and Western burrowing owls (burrow sites) are State Species of Special Concern; White tailed kite is a State Species of Special Concern and "California Fully Protected Species"; Loggerhead shrike a State Species of



California red-legged frog

Special Concern which nests in the willows at the site. Two species of Fairy shrimp, the longhorned fairy shrimp, Federally Endangered, and vernal pool fairy shrimp, Federally Threatened occur at the site.

Geology/Soils

The Vasco Caves area lies within the border zone of the Coast Ranges and Great Valley geomorphic provinces just below the crest of the last flank of the Diablo Range on the east side. The hill slopes of the project area are composed of well-drained clays and silty clay loams that overlay both thinly bedded and massive sandstone formations; these formations, which are interbedded with shales, siltstones, and conglomerates, date to the Upper Cretaceous (Simons, 1982:35). The sandstone outcrops contain wind and water eroded caves. The Vasco Caves occupy a distinct group of outcrops comprising an irregular area approximately 1/2 mile square and ranging in elevation from 600 to 1,000 feet above sea level.

The bedrock geology consists of marine cretaceous rocks originally referred to as Panoche formations (Rogers, Thomas H. 1966 Geologic map of California, San Jose sheet). The marine rocks are predominantly of sandstone. The sequence of sandstone is miles thick and in a few places it includes conglomerate beds with boulders up to a foot in diameter (Briggs, 1953 University of California Geological Sciences, vol 29, No. 8). The presence of the conglomerates and the large size of the boulders suggest that the shoreline of a shallow inland sea was nearby. This cretaceous sequence drops down in a great down fold beneath the floor of the San Joaquin valley (Bishop, 1970 California Division of Mines and Geology #104). The strata are younger towards the east and eventually include Eocene and Miocene sequences. The uplift of these rocks coincide with the uplift of the Coast Ranges themselves which is mostly in the last two million years. The uplift exposed these resistant sandstone to various forms of erosion (including wind and water) and left them standing as isolated rock outcrops called inselbergs. The inselbergs are the prominent, bare rocky hills of Vasco Caves.

There is little high-quality soil in the parkland. The best is found only in level areas along Brushy Creek. Many of the ridges and slopes in the park have a high erosion hazard. Slope stability is a concern at Vasco Caves on the steep eroded service roads which provide access to emergency and maintenance vehicles and the caretaker's residence. These roads will need to be upgraded to improve the preserve's internal circulation. The Marsh Creek fault is the only active fault within the Vasco Caves area. The potential for earthquakes in this area may be less than in areas along the Hayward or San Andreas faults.

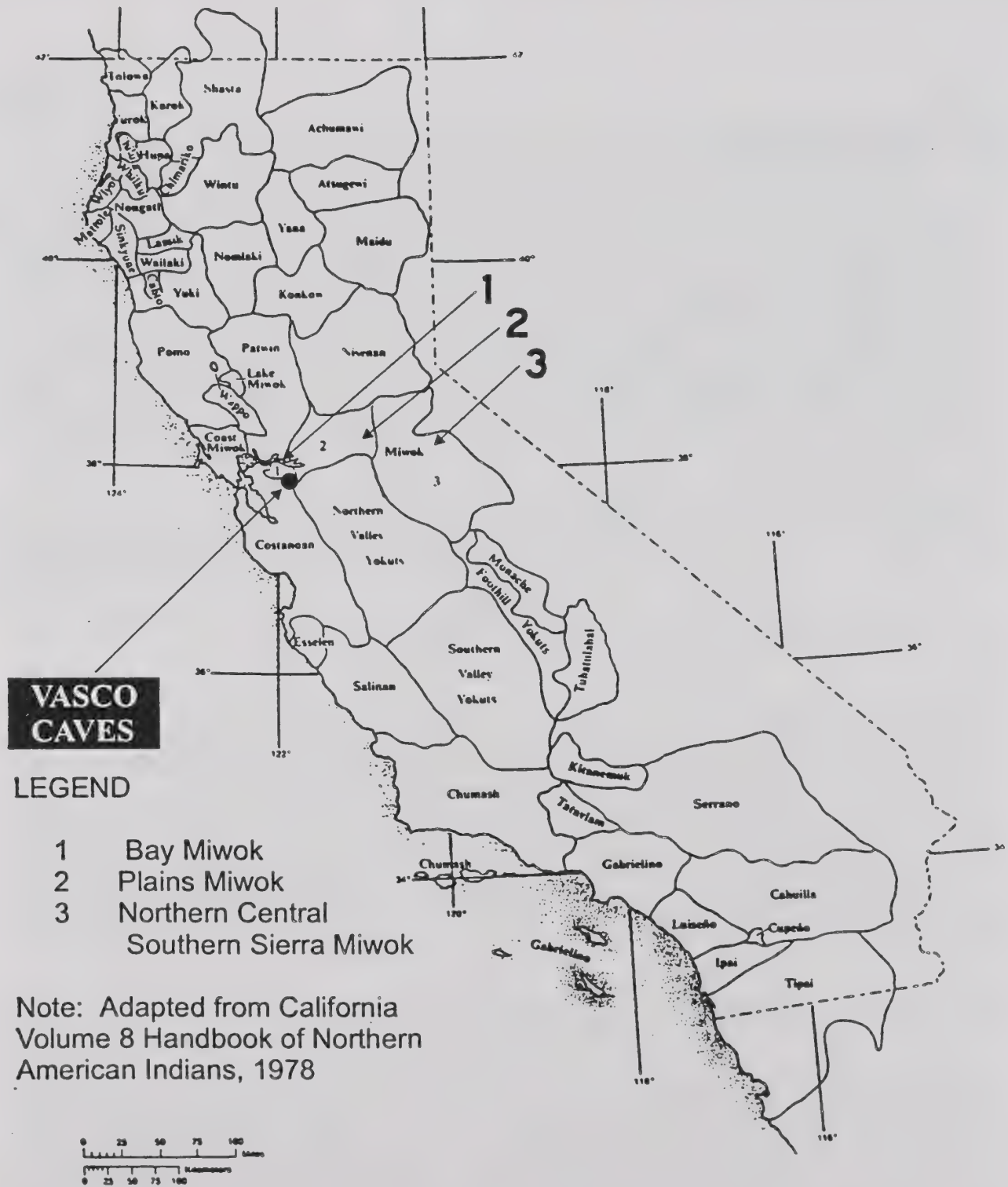
B. Cultural Resources

The following summary description of the Vasco Caves cultural resources is based on the 1996 report, "Rock Art of the Vasco Caves" prepared by Jeffrey B. Fentress for the Anthropological Studies Center at Sonoma State University. The report was completed as part of the cultural resources studies undertaken by the Contra Costa Water District for the Los Vaqueros dam and reservoir project. Cultural resource studies for the Los Vaqueros Project have been conducted in compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and the California Environmental Quality Act. Vasco Caves is eligible for listing on the National Register of Historic Places.

The Vasco Caves archaeological site (CA-CCO-434/H) is an extensive complex located within the Los Vaqueros land grant. Both historic and prehistoric archaeological features are found at the Vasco Caves. Historic features include hand-chiseled steps and graffiti in non-modern script. Prehistoric archaeological features include debris from food-processing features (bedrock mortars) and habitation areas. The presence of prehistoric rock art distinguishes the Vasco Caves from other archaeological sites.

The rock art of Vasco Caves is remarkable from both the local and regional perspective. CA-CCO-434/H contains an unusual variety of distinct rock art styles. The rock art reflects a mixture of local and regional Native American cultures. The area surrounding the Vasco Caves was once inhabited by several different Native American groups from the Delta, the northern San Joaquin Valley, the Sierra, and the Kellogg Creek watershed. Prehistorically the Altamont Pass was a major trade route linking the Bay Area to the Central Valley. The Vasco Caves area would have been accessible to at least three Native American groups speaking distinct languages during late prehistoric and early contact periods (See Figure 3).

The numerous deep bedrock mortars and well-developed midden soils indicate that the Vasco Caves were used for a considerable time, from A.D. 500 to the time of contact with Europeans. The unusual variety of rock art styles indicates that the rockshelters and caves at CA-CCO-434/H were not only used over time, but probably by different tribal groups. Although the rock art and other archaeological evidence indicate a probable long-term use of the site, the area directly surrounding the caves is not characterized by plentiful subsistence resources (e.g., oaks and other nut bearing trees). The qualities that attracted people to the Vasco Caves are of a different type: the striking rock features, the setting, and the abundant bird life.



Key to Tribal Territories **VASCO CAVES REGIONAL PRESERVE** **Resource Management Plan**

Prepared by EJRPD - Planning Stewardship Department, 2950 Penita Oaks Court, P.O. Box 5381, Oakland, CA 94605 APRIL 1997

Figure 3

The variety of rock art styles signify complex interactions between Native Americans who used the site. Ethnographic data shows that similar rock art in central and south central California is primarily associated with socio-religious activities. The variety of painting styles at the caves are related not only to the local setting but also to a much broader pattern of cultural influence. These designs are comparable to sites in southern San Joaquin and Monterey counties suggesting that the transmission of cultural traditions occurred on a regional scale. The rock art traditions may have evolved over time through local tribal interactions, or may have been brought to the local area by specific individuals on long distance journeys.

Perhaps the most remarkable aspect of the Vasco Caves is simply that they still exist on the edge of such a large urban area. These cultural resources are irreplaceable and hold significant value for Native American groups, the academic community, and the public. The educational and research potential of the Vasco Caves is unique in Central California.

C. Circulation And Facilities

Access

Interstate 580 and Highway 4 are major east-west routes which make Vasco Caves Regional Preserve accessible from cities in the East Bay and nearby Livermore Valley. The local exit from Interstate 580 is Vasco Road. Vasco Road, the main north-south connector road for eastern Contra Costa County, is the only local road that provides access to the preserve. Emergency vehicle and maintenance access (EVMA) roads used by EBRPD staff currently enter the park at one location.

The primary emergency and maintenance vehicle entrance to the park is via a graveled road on the east side of the preserve off of Vasco Road. This road is subject to erosion during the wet months of the year. This road also provides access to the temporary facilities installed for a caretaker's residence. When that road is not accessible, another EVMA entrance to the preserve is through a crossing under Vasco Road for cattle used by a former land owner. Contra Costa Water District will construct a new road along the northern boundary of the preserve as a replacement for a Howden Wind Farm access that will be inundated by the reservoir filling.

Parking

There are no developed parking areas at the preserve. A fairly flat site exists along the proposed northern boundary road alignment. This site provides an opportunity for future parking and staging for public educational programs.

Trails

Circulation within the preserve consists of single lane, unimproved roads and cattle trails. These interior roads were used by the former landowners for ranch-related uses. The unimproved ranch roads provide an opportunity for an interpretive and regional trail route, with minimal need for trail development. The location of these roads have been determined by the topography of the site. One route follows the Brushy Creek drainage and intersects with a trail leading to a ridge along the preserve's northern boundary. Roads along Brushy Creek also lead south to Brushy Peak. Brushy Peak is an open space park owned by Livermore Area Recreation and Park District (LARPD). The road alignment along Brushy Creek between Vasco Caves and Brushy Peak may serve as a regional trail linking these two significant land formations. In the center of the preserve, a steep trail connects the high ridge from the northern boundary to the rock outcrops of the Vasco Caves. A loop trail encircles the westernmost rock outcrops and returns to this

primary ridge trail. This trail, linking the scenic high ridge with the rock outcrops will provide the interpretive trail system for the preserve. Existing unimproved roads that are not a part of the proposed interpretive or regional trail system would be signed as closed to the public. Due to the sensitive cultural and wildlife resources of the preserve, interpretive programs will permit hiking-only access on the trails.

Facilities

Apart from the unimproved ranch roads, there are no developed facilities (parking, restrooms) in the preserve. During November 1996, a 26-foot trailer, generator, 1,000 gallon water and 1,500 gallon waste tank were brought to the site to provide basic facilities for an interim caretaker's residence. The caretaker will live on the preserve to provide continuous security at Vasco Caves, pending the completion of a joint operating agreement between CCWD and EBRPD.

Four locations for a permanent security residence were considered. Two locations are next to the EVMA road that intersects Vasco Road on the east side of the preserve. One level site at the bottom of the EVMA road was eliminated due to the potential noise and security problems. A second site is located in a saddle off of the EVMA road. This site is too windy for a residence. A third location is the current site for the caretaker's residence. This site is near the intersection of the EVMA road and the interpretive trail route, in a flat area to the northeast of the rock outcrops. On the northern edge of the preserve a fourth location provides an adequate level area for a residence. These two sites will be evaluated to determine minimal impact on visual and biological resources and for the cost of grading and drainage requirements.

III. RESOURCE MANAGEMENT AND PUBLIC ACCESS PLAN

The 1996 East Bay Regional Park District Master Plan designates the Vasco Caves as a regional preserve to protect its significant natural and cultural resources. This classification indicates that the preserve will receive a high level of resource protection. Therefore this Resource Management Plan establishes policies and recommends actions to protect and manage botanic, wildlife, and cultural features as a primary objective, and to allow controlled public access for educational, cultural, and scientific uses as a secondary objective. The italicized text in section III indicates long-range planning policies for resource management and identifies specific requirements for resource protection, public access and public safety.



Instead of developing facilities for public use, the focus of this plan lies in preservation of resources for people to enjoy through a system of guided interpretive programs. This plan provides new educational and trail use opportunities for the people of the East Bay, especially the residents of eastern Contra Costa County and has been specifically designed to provide public access and enjoyment of the preserve and resource protection with minimal environmental impact.

The plan calls for a small staging area on the perimeter of the park that includes parking, restrooms, and picnic facilities. The rest of the preserve will be managed for natural and cultural resources (See Figure 4). The resource management actions below outline the

programs that will promote overall plant and animal diversity and conserve habitat for rare, threatened, and endangered species. The recommended actions for public access identify resource interpretation areas, trails, programs, site security measures and facilities.

A. Resource Management

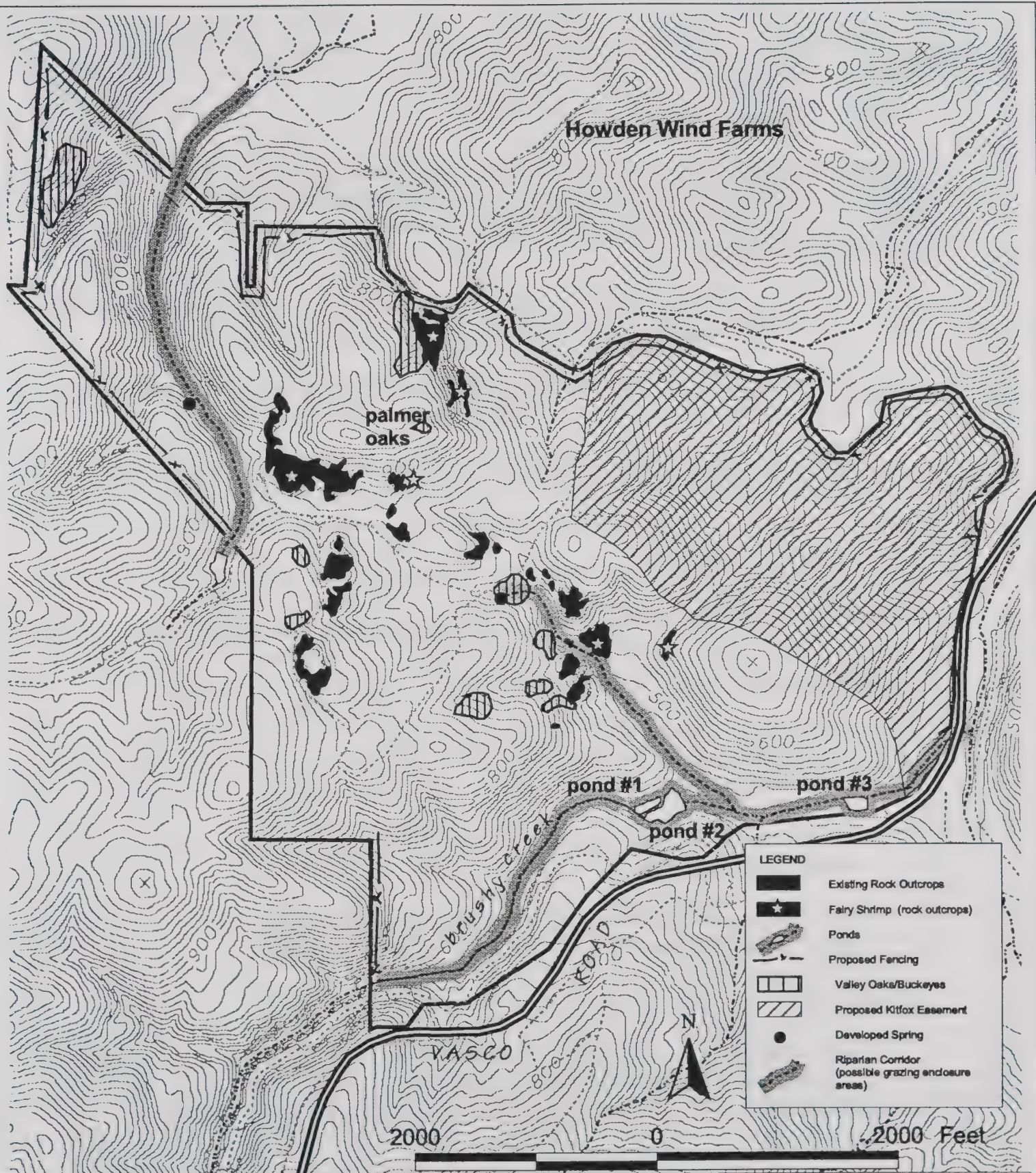
Rangeland Vegetation

Livestock grazing will be the primary tool for managing vegetation on the preserve due to its practicality and cost-effectiveness in preventing fire and maintaining biodiversity. Prescribed burning and mowing will be used as secondary vegetation management alternatives. The primary vegetation management goal will be to maintain and enhance native vegetation and conserve wetland and riparian areas. The preserve's boundaries will be fenced and secured to achieve an ultimate level of control over management of public land. Livestock grazing would continue on the preserve as in the past, but with more regulation over livestock numbers and the season of use. There will be an ongoing effort to conserve and protect sensitive resources within the context of grazing.

In the event of a future decision to eliminate livestock grazing on park land, the EBRPD would continue to assist CCWD in meeting ongoing mitigation responsibilities set forth by the Department of Fish and Game to maintain an 169 acre conservation easement within the preserve as suitable habitat for kit fox in compliance with federal and state endangered species acts.

- *Construct and maintain boundary fencing along the perimeter of the preserve to achieve control over land management and to regulate public access to the area.*
- *Remove existing internal barbed wire fencing to enhance the open space character of the landscape.*
- *Conduct a seasonal livestock grazing operation on the preserve, which allows alternative periods of grazing and rest. Allow livestock grazing on the preserve from October or November through April or May, with the flexibility to adjust animal numbers and season of use to existing range conditions.*
- *Prohibit ranchers' use of dogs on the preserve for rounding up cattle.*

- *Eliminate or regulate, through the use of exclosure fencing, livestock grazing in areas of the preserve that contain sensitive riparian and wetland resources. These areas include Brushy Creek, including the pond environments within the streamcourse, the small drainage below the first set of rock outcrops north of Vasco Road, and the spring-fed drainage in the northwest portion of the Preserve. Make accommodations to ensure that alternate water sources are available to provide drinking water for livestock.*
- *Locate livestock water storage facilities on dry land away from the spring source and maintain the integrity of the associated wetland by either: (1) allowing excess water from the trough or tank to back up to the source by installing float valve mechanisms and pressure release fittings in the plumbing, or (2) by directing overflow water from the trough into a nearby natural drainage channel.*
- *Manage grazing to ensure appropriate levels of residual dry matter.*
- *Encourage valley and Palmer oak regeneration on the Preserve by using wire cages to protect naturally occurring valley oak seedlings from browsing animals and, if necessary, through planting. Continue surveys for rare, threatened and endangered plants on the preserve.*
- *Emphasize non-toxic measures for controlling rodents, when needed. Rodenticides will be used only if a public health problem were to occur.*
- *Manage land to enhance native grasslands (required on 169 acres of Habitat Management lands [HM lands] to benefit kit fox habitat).*



Natural Resource Management **VASCO CAVES REGIONAL PRESERVE** **Resource Management Plan**

Prepared by EBRPD - Planning/Stewardship Department 2950 Peralta Oaks Court, P.B. Box 5381, Oakland, CA 94605 May 16, 1997

Figure 4

Wildlife

All park activity (operations, interpretation, range management) will be conducted by the District in accordance with the practices for managing regional resources and consistent with state and federal laws preventing human related disturbances to threatened and endangered species.

- *Specific locations (observation stations) to view wildlife during interpretive programs will be identified (annually) by the EBRPD staff.*
- *Naturalist-led public groups will view wildlife from “observation stations” maintaining a distance of approximately 100 feet from raptor nests and roosts.*
- *Observation stations may be closed seasonally during the breeding period for special status animals. Maintenance and livestock management will also be coordinated with EBRPD staff.*
- *Closure zones will restrict park activity around raptors and kit fox during breeding seasons.*
- *Ponds will be managed to benefit the federally threatened red-legged frog populations. Ponds 1, 2, and 3 will be managed to remove non-native fish and amphibians under the EBRPD’s “native amphibian management guidelines.”*
- *Special status animals and their habitats (fairy shrimp, burrowing owls, red-legged frogs, kit foxes, and raptors) will be managed in accordance with state and federal laws and agreements to avoid impacts.*
- *A kit fox conservation easement of 169 acres (see Figure 4) is designated as an area to be managed for kit fox habitat.*
- *In accordance with USFWS kit fox standards, dogs will not be permitted on the preserve. This includes dogs owned by visitors, EBRPD staff and the caretaker.*

Geology/Soil

- *Slope stabilization and grading will be needed on EVMA roads to improve internal circulation for maintenance vehicles. Public access trails will use existing roads. The staging area will be built on a site that will not affect unstable soils or geology.*

Cultural

CCWD is obligated to follow a cultural resources management program complying with Section 106 of the National Historic Preservation Act. See Appendix G for specific mitigation measures. The rock art at Vasco Caves is especially vulnerable to natural forms of decay (weathering, salts, and algae) because of its location on sandstone. Implementation measures to preserve the rock art will be investigated.

- *Prehistoric and historic archaeological data will remain confidential.*
- *Periodic monitoring of the rock paintings will be conducted to assess human impacts and weathering.*
- *Guided interpretive tours will be restricted to planned trails and identified rock outcrops.*
- *At restricted sites, protective measures such as installing fences and planting appropriate vegetation at cave entrances may be taken to prevent trespass, as needed.*
- *During construction of the staging area, an archaeological monitor will be available to evaluate any artifactual material, if needed.*
- *The County Coroner will be contacted if pre-historic human remains are encountered during construction of the staging area.*
- *Preserve boundaries will be fenced and on-site security, routine and aerial patrols, will deter casual access to archaeologic sites.*

B. Public Access and Circulation

The following actions are recommended to provide controlled public access at Vasco Caves Regional Preserve.

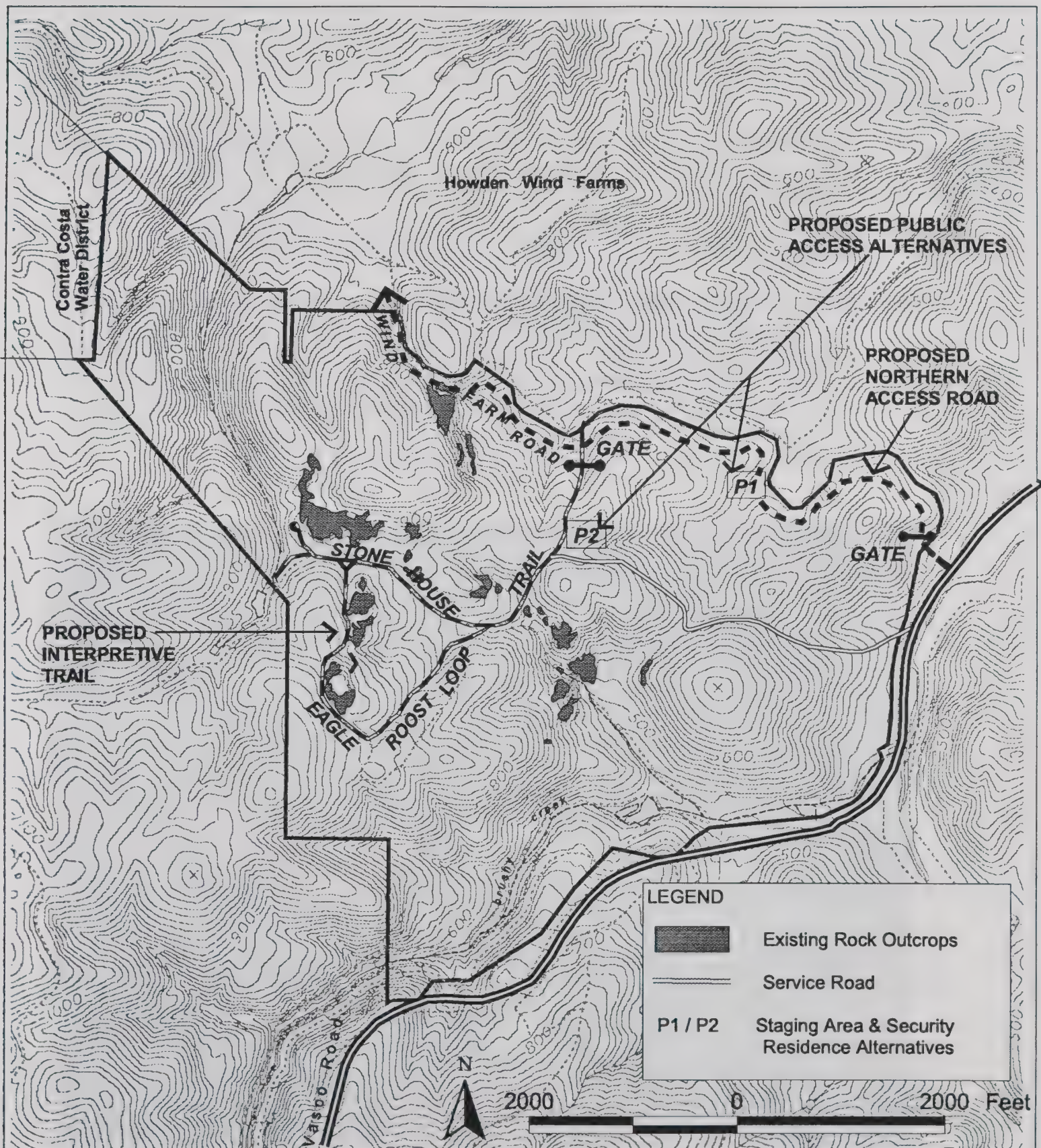
Parking

- *Several locations for a parking area were considered (see Figure 5). Two locations using the northern access road (Wind Farm Road) are optimal for providing public access. The preferred location would be adjacent to Wind Farm Road. This relatively flat site is located on the perimeter of the preserve and is out of view of Vasco Road. It is large enough to include a graveled 25-35 car parking area, a bus turnaround, restroom and a residence. This is the most feasible site to develop because of its minimal impact on resources and relatively minor grading and drainage requirements. The location of this parking area depends upon the final design and engineering of the northern access road.*
- *A second site is located at the intersection of the Stone House Trail and the service road. This site is also large enough to accommodate parking and the residence. The Stone House Trail alignment between Wind Farm Road and the service road will require extensive grading, drainage and paving to provide year round access to this site. Facilities located in this area will have a greater visual impact on the preserve than they would at the other location. Both options will be evaluated for design and engineering costs.*

Roads and Trails

Internal Circulation

- *The primary interpretive trail into Vasco Caves will be via the Stone House Trail. This trail connects the ridge along the northern boundary to the rock outcrops at the interior of the preserve (see Figure 5). The distance from the staging area to the end of the trail is a little over one mile. Branching off the Stone House Trail is the Eagle Roost Loop. This trail provides hikers with a return loop less than a mile long. The entire interpretive trail route is approximately 3¼ miles. All but one of these trails are on existing ranch roads. A narrow, hiking only trail will be aligned between two existing ranch roads to create the loop. Trail use will be limited to pedestrian access under the supervision of a naturalist. Special needs visitors may request vehicle access.*
- *Two roads will serve park vehicles. One is the graveled road that currently serves the interim caretaker's residence. The other road will be constructed in 1997 along the northern boundary of the preserve to provide access for Howden Wind Farm and other associated landowner vehicles. A segment of this road (Wind Farm Road) will provide public access to the Vasco Caves staging/parking site.*



Public Access Plan **VASCO CAVES REGIONAL PRESERVE** **Resource Management Plan**

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Figure 5

- *Existing roads that are not part of the proposed trail system will not be maintained. These roads will be closed to the public and signed as off-limits until they return to a natural condition.*

Regional Trail

- *A regional trail alignment linking Vasco Caves and Brushy Peak will be determined at a later date and will be subject to further evaluation as an amendment to this plan or as a separate plan document. Due to the sensitive resources of Vasco Caves, access inside the preserve will be limited. The regional trail will provide an additional interpretive feature for public programs at the preserve. This trail does not connect to other parks outside of Vasco Caves and Brushy Peak, therefore, its use will be limited to interpretive programs at these locations.*



Vernal pool

Interpretive Programs

- *Educational programs will be developed to provide for the interpretation of the Native American culture and use of the caves area, the wildlife of the preserve, and the ranching and industrial land uses surrounding Vasco Caves.*
- *EBRPD interpretive and wildlife staff will collaborate annually to identify suitable areas for group visits.*
- *EBRPD will explore inter-agency partnerships supportive of interpretive efforts to represent local Native American culture and history.*
- *Supervised tours of the preserve will be provided on a reservation only basis. Visitors will register for tours through the District's reservations department.*
- *Groups will be limited to a maximum of 35 visitors. Larger groups will require two leaders to manage visitors and protect resources.*

Special Use Permits

The EBRPD recognizes the opportunities for academic study and research of the natural and cultural resources on District parklands. The EBRPD has existing policies to provide research activities that do not degrade park resources. A Research Committee composed of the Chief of Interpretation, the Chief of Parks, and the Land Stewardship Manager review applications and issue conditional research permits based on established criteria. Requests for ceremonial use of Vasco Caves by Native American religious practitioners will be accommodated by the EBRPD through this process.

- *Research applications will be reviewed and appropriate conditions will be stipulated to avoid physical degradation of the preserve.*
- *Ceremonial use permits will be reviewed and appropriate conditions will be stipulated to avoid physical degradation of the preserve and to avoid conflicts with regularly scheduled interpretive programs.*
- *Ceremonial use will be restricted to authoritative representatives of an Indian religion. Practitioners are limited to ceremonies that are documented as traditional or historic to local East Bay Native American tribes as identified by the state Native American Heritage Commission.*

C. Public Safety

The EBRPD will provide for the safety and protection of park visitors and staff, the protection of natural resources and preserve facilities, and the protection of adjacent neighbors and their property in conjunction with local public safety agencies. Measures employed to manage public safety risks include a vegetation management program, an emergency communications system, and on-site police and fire presence as required. The EBRPD's Public Safety Department participates fully in county and state Fire and Police Interagency Mutual Aid Systems. Special forms of patrol, including helicopter surveillance and response, will be used at Vasco Caves. The Department also maintains cooperative working agreement with local police and fire jurisdictions to assure prompt response in emergencies.

Emergency Medical and Fire Services (EMS)

- *A comprehensive EMS-Fire Services plan will be developed including vegetation management, emergency access and response, and cooperative agreements with local EMS and fire agencies.*
- *Fire department staff will coordinate with California Department of Forestry (CDF) local battalion chiefs to fight fires using hand crews, trucks, and helicopters before employing air tankers and bull dozers to minimize the impacts of soil disturbance and fire retardant on the preserve.*

Site Security

On-site security at Vasco Caves will provide protection for preserve resources. Several options for providing security will be evaluated after the preserve has been opened based upon actual needs. A caretaker could provide 24-hour protection, make daily inspections and monitor sensitive resources. EBRPD public safety and ranger patrols for Vasco Caves could be reduced if a permanent caretaker were installed. A less costly option would be to place a park security resident on site to deter unlawful behavior on the preserve. A third option would require a park ranger to provide security patrols and resource protection.

- *Permanent security options will be evaluated after the preserve has been open for public access.*
- *Boundary fencing and signs will be installed as needed to prevent trespass.*
- *A gate will be installed in the cattle tunnel under Vasco Road to control illegal vehicular access.*

Appendix A

FIELD SURVEY METHODOLOGY

Field surveys of the 750 acre Vasco Caves Regional Preserve were conducted throughout the winter, spring and summer of 1996 on 1/4, 1/17, 3/5, 4/30, 6/17, and 7/18/96. Natural landscape features such as plant communities and wetland areas were mapped and identified. Structures associated with long-term land uses in the area, such as fences, corrals, gates, developed springs, and ponds were located on maps and described. Annual forage production was determined for average, favorable, and unfavorable rainfall years using information contained in the Contra Costa County Soil Survey.

Vegetation Mapping

Vegetation mapping was compiled from available aerial photographs and USGS topographic maps in conjunction with site visits in the field. An ongoing plant inventory was maintained over the course of the field work to identify plant species occurring on the Preserve and to acquire a sense of the land and its relative vegetative condition. The inventory was conducted by foot and/or vehicle in different areas within the Preserve. The plant inventory is by no means exhaustive, and is intended as an ongoing list to which additional species can be added over time (see attached plant list).

Natural Plant Communities were named according to Sawyer's and Keeler-Wolf's, A Manual of California Vegetation (1995), where applicable. This reference classifies vegetation into "series," which constitutes subsets of tree, shrub, or herbaceous plant communities. Thus, a tree community might include a blue oak or coast live oak series, a shrub community a chamise or coyote brush series, and so on.

The plant communities identified can be cross-referenced to vegetation types established for the California Wildlife Habitat Relationships (WHR) database of the California Department of Fish and Game (Airola 1988, Mayer and Laudenslayer 1988, Timosi et al. 1989, Zeiner et al. 1988a, 1988b, 1990). The WHR is used, among other things, to predict wildlife species associated with various plant communities.

Rare, Threatened and Endangered Plants

The California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California, 5th edition (Skinner and Pavlik 1994), and the CNPS Electronic Inventory were reviewed to determine which plants have the potential to occur on the site. A summary of these species is attached. A search was completed of the California Natural Diversity Database (NDDDB 1995) to determine if any special status plants or natural communities had been reported in the area. The results indicated that no known rare, threatened, or endangered plants occurred on the Preserve.

RANGE ANALYSIS

The following pages provide a range analysis report generated for Vasco Caves Regional Preserve. The range analysis process is used to estimate forage production and determine the number of animals that can be supported on a given area of land consistent with resource conservation objectives. Where historical or current grazing records are available, the process is used to verify whether existing use levels are adequate, or whether adjustments are necessary. Where this information is unavailable, the analysis offers a reliable method for establishing an initial stocking rate.

The range analysis is based on information contained within the USDA Soil Conservation Service soil survey for Contra Costa county. The soil survey groups soils into "range sites" on the basis of similarities in texture, depth, and slope. Forage production estimates for favorable and unfavorable rainfall years are provided in pounds per acre for each range site. This information is used in conjunction with vegetation data collected in the field to prepare the final reports.

The process incorporates residual dry matter standards, which are used to determine the amount of vegetation that should remain on the ground at the end of the grazing season. This residue or mulch acts as a protective layer over the soil to guard against erosion, encourage nutrient recycling, and promote optimum conditions for plant growth. Total forage production minus residual dry matter equals the amount of forage available for livestock to consume.

Additional adjustments in stocking levels may be necessary in situations where steep terrain and/or the lack of available drinking water limit or preclude grazing use on certain areas of the park where forage is otherwise available. Areas of high recreation use, wetlands, and sites containing notable resources may also require exclusion from livestock use.

Once a stocking rate has been established, use levels can be changed to reflect existing conditions. Plant production and species composition can fluctuate drastically from year to year in response to temperature differences and the timing and amount of rainfall during the growing season, and some adjustments in stocking levels are usually necessary to ensure that grazing occurs within established standards. The District's range manager conducts periodic inspections of the park during the grazing season to determine if grazing use needs to be modified to achieve proper utilization.

EBRPD Range Analysis

Park: **Vasco Caves**

Property: **Walker - All**

Date: **July 19, 1996**

ACREAGE SUMMARY

Contra Costa County

Low Precipitation Zone

Disk file: VC-RA-WA.WB2

RANGE SITE	MAP AREA (in hundredths of a square inch)								
	Vegetation Types								Total
	B	C	E	G	Gu	O	Ou	S	
C	0	0	0	58	0	0	0	0	58
CP	0	0	0	0	0	0	0	0	0
CS	0	0	0	140	0	0	0	0	140
CVS	0	0	0	20	0	0	0	0	20
FL	0	0	0	0	0	0	0	0	0
FLS	0	0	0	0	0	0	0	0	0
FLVS	0	0	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0	0	0
LS	0	0	0	0	0	0	0	0	0
LVS	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0
SCL	0	0	0	0	0	0	0	0	0
SCLS	0	0	0	0	0	0	0	0	0
SFL	0	0	0	0	0	0	0	0	0
SFLS	0	0	0	45	0	5	0	0	50
SFLVS	0	0	0	0	0	0	0	0	0
SS	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	263	0	5	0	0	268

ON GROUND AREA (in acres)								
Vegetation Types								
B	C	E	G	Gu	O	Ou	S	Total
0.0	0.0	0.0	53.3	0.0	0.0	0.0	0.0	53.3
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	128.6	0.0	0.0	0.0	0.0	128.6
0.0	0.0	0.0	18.4	0.0	0.0	0.0	0.0	18.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.							

Abbr.	Range Site (from Soil Conservation Service)
C	Clayey
CP	ClayPan
CS	Clayey Steep
CVS	Clayey Very Steep
FL	Fine Loamy
FLS	Fine Loamy Steep
FLVS	Fine Loamy Very Steep
L	Loamy
LS	Loamy Steep
LVS	Loamy Very Steep
S	Sandy
SCL	Shallow Coarse Loamy
SCLS	Shallow Coarse Loamy Steep
SFL	Shallow Fine Loamy
SFLS	Shallow Fine Loamy Steep
SFLVS	Shallow Fine Loamy Very Steep
SS	Sandy Steep

Abbr.	Vegetation Type
B	Bay-oak woodland
C	Chaparral
E	mixed Evergreen
G	annual Grassland
Gu	annual Grassland, ungrazed
O	mixed Oak woodland
Ou	mixed Oak woodland, ungrazed
S	assorted Scrub

Conversion Factors	
Map Scale	1: 24000
Lbs./AUM	780

Acres for Grazing	
Suitable	246
Unsuitable	0
TOTAL	246

Animal Unit Equivalents	
Cow/calves	1.0
Horses	1.5
Yearlings	0.7

EBRPD Range Analysis

Park: **Vasco Caves**

Property: **Walker - All**

Date: **July 19, 1996**

AVERAGE YEAR PRODUCTIVITY

Contra Costa County

Low Precipitation Zone

RANGE SITE	Total Available Production (lbs.)								
	Vegetation Types								Total
	B	C	E	G	Gu	O	Ou	S	
C	0	0	0	59651	0	0	0	0	59651
CP	0	0	0	0	0	0	0	0	0
CS	0	0	0	131129	0	0	0	0	131129
CVS	0	0	0	16529	0	0	0	0	16529
FL	0	0	0	0	0	0	0	0	0
FLS	0	0	0	0	0	0	0	0	0
FLVS	0	0	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0	0	0
LS	0	0	0	0	0	0	0	0	0
LVS	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0
SCL	0	0	0	0	0	0	0	0	0
SCLS	0	0	0	0	0	0	0	0	0
SFL	0	0	0	0	0	0	0	0	0
SFLS	0	0	0	28926	0	459	0	0	29385
SFLVS	0	0	0	0	0	0	0	0	0
SS	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	236235	0	459	0	0	236694

	Total Available Production (AUM's)								
	Vegetation Types								Total
	B	C	E	G	Gu	O	Ou	S	
	0	0	0	76	0	0	0	0	76
	0	0	0	0	0	0	0	0	0
	0	0	0	168	0	0	0	0	168
	0	0	0	21	0	0	0	0	21
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	37	0	1	0	0	38
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	303	0	1	0	0	303

RANGE SITE	Available Production (lbs/acre)							
	Vegetation Types							
	B	C	E	G	Gu	O	Ou	S
C	0	0	0	1120	0	540	0	0
CP	0	0	0	500	0	60	0	0
CS	0	0	0	1020	0	340	0	0
CVS	0	0	0	900	0	140	0	0
FL	0	0	0	1230	0	618	0	0
FLS	0	0	0	1130	0	430	0	0
FLVS	0	0	0	1030	0	230	0	0
L	0	0	0	900	0	360	0	0
LS	0	0	0	800	0	160	0	0
LVS	0	0	0	600	0	0	0	0
S	0	0	0	100	0	0	0	0
SCL	0	0	0	400	0	0	0	0
SCLS	0	0	0	200	0	0	0	0
SFL	0	0	0	800	0	300	0	0
SFLS	0	0	0	700	0	100	0	0
SFLVS	0	0	0	500	0	0	0	0
SS	0	0	0	0	0	0	0	0

Carrying Capacity by Duration and Animal Type						
Months:	2	4	6	8	10	12
Cow/calves	152	76	51	38	30	25
Horses	101	51	34	25	20	17
Yearlings	217	108	72	54	43	36

Acres for Grazing	
Suitable	246
Unsuitable	0
TOTAL	246

Suitable Acres/AUM = 0.81

EBRPD Range Analysis

Park: **Vasco Caves**
 Property: **Walker - All**
 Date: **July 19, 1996**

FAVORABLE YEAR PRODUCTIVITY
Contra Costa County
Low Precipitation Zone

RANGE SITE	Total Available Production (lbs.)								
	Vegetation Types								Total
	B	C	E	G	Gu	O	Ou	S	
C	0	0	0	76694	0	0	0	0	76694
CP	0	0	0	0	0	0	0	0	0
CS	0	0	0	185124	0	0	0	0	185124
CVS	0	0	0	25712	0	0	0	0	25712
FL	0	0	0	0	0	0	0	0	0
FLS	0	0	0	0	0	0	0	0	0
FLVS	0	0	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0	0	0
LS	0	0	0	0	0	0	0	0	0
LVS	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0
SCL	0	0	0	0	0	0	0	0	0
SCLS	0	0	0	0	0	0	0	0	0
SFL	0	0	0	0	0	0	0	0	0
SFLS	0	0	0	49587	0	1837	0	0	51423
SFLVS	0	0	0	0	0	0	0	0	0
SS	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	337117	0	1837	0	0	338953

	Total Available Production (AUM's)								
	Vegetation Types								Total
	B	C	E	G	Gu	O	Ou	S	
	0	0	0	98	0	0	0	0	98
	0	0	0	0	0	0	0	0	0
	0	0	0	237	0	0	0	0	237
	0	0	0	33	0	0	0	0	33
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	64	0	2	0	0	66
	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
	0	0	0	432	0	2	0	0	435

Range Site	Available Production (lbs/acre)							
	Vegetation Types							
	B	C	E	G	Gu	O	Ou	S
C	0	0	0	1440	0	840	0	0
CP	0	0	0	900	0	300	0	0
CS	0	0	0	1440	0	640	0	0
CVS	0	0	0	1400	0	440	0	0
FL	0	0	0	1560	0	936	0	0
FLS	0	0	0	1560	0	760	0	0
FLVS	0	0	0	1560	0	560	0	0
L	0	0	0	1200	0	600	0	0
LS	0	0	0	1200	0	400	0	0
LVS	0	0	0	1000	0	200	0	0
S	0	0	0	400	0	0	0	0
SCL	0	0	0	800	0	160	0	0
SCLS	0	0	0	600	0	0	0	0
SFL	0	0	0	1200	0	600	0	0
SFLS	0	0	0	1200	0	400	0	0
SFLVS	0	0	0	1000	0	200	0	0
SS	0	0	0	200	0	0	0	0

Carrying Capacity by Duration and Animal Type						
Months:	2	4	6	8	10	12
Cow/calves	217	109	72	54	43	36
Horses	145	72	48	36	29	24
Yearlings	310	155	103	78	62	52

Acres for Grazing	
Suitable	246
Unsuitable	0
TOTAL	246

Suitable Acres/AUM = 0.57

EBRPD Range Analysis

Park: **Vasco Caves**

Property: **Walker - All**

Date: **July 19, 1996**

UNFAVORABLE YEAR PRODUCTIVITY

Contra Costa County

Low Precipitation Zone

RANGE SITE	Total Available Production (lbs.)									
	Vegetation Types									Total
	B	C	E	G	Gu	O	Ou	S		
C	0	0	0	42608	0	0	0	0	0	42608
CP	0	0	0	0	0	0	0	0	0	0
CS	0	0	0	77135	0	0	0	0	0	77135
CVS	0	0	0	7346	0	0	0	0	0	7346
FL	0	0	0	0	0	0	0	0	0	0
FLS	0	0	0	0	0	0	0	0	0	0
FLVS	0	0	0	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0	0	0	0
LS	0	0	0	0	0	0	0	0	0	0
LVS	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0
SCL	0	0	0	0	0	0	0	0	0	0
SCLS	0	0	0	0	0	0	0	0	0	0
SFL	0	0	0	0	0	0	0	0	0	0
SFLS	0	0	0	8264	0	0	0	0	0	8264
SFLVS	0	0	0	0	0	0	0	0	0	0
SS	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	135354	0	0	0	0	0	135354

	Total Available Production (AUM's)									
	Vegetation Types									Total
	B	C	E	G	Gu	O	Ou	S		
	0	0	0	55	0	0	0	0	0	55
	0	0	0	0	0	0	0	0	0	0
	0	0	0	99	0	0	0	0	0	99
	0	0	0	9	0	0	0	0	0	9
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	11	0	0	0	0	0	11
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	174	0	0	0	0	0	174

Range Site	Available Production (lbs/acre)							
	Vegetation Types							
	B	C	E	G	Gu	O	Ou	S
C	0	0	0	800	0	240	0	0
CP	0	0	0	100	0	0	0	0
CS	0	0	0	600	0	40	0	0
CVS	0	0	0	400	0	0	0	0
FL	0	0	0	900	0	300	0	0
FLS	0	0	0	700	0	100	0	0
FLVS	0	0	0	500	0	0	0	0
L	0	0	0	600	0	120	0	0
LS	0	0	0	400	0	0	0	0
LVS	0	0	0	200	0	0	0	0
S	0	0	0	0	0	0	0	0
SCL	0	0	0	0	0	0	0	0
SCLS	0	0	0	0	0	0	0	0
SFL	0	0	0	400	0	0	0	0
SFLS	0	0	0	200	0	0	0	0
SFLVS	0	0	0	0	0	0	0	0
SS	0	0	0	0	0	0	0	0

Carrying Capacity by Duration and Animal Type						
Months:	2	4	6	8	10	12
Cow/calves	87	43	29	22	17	14
Horses	58	29	19	14	12	10
Yearlings	124	62	41	31	25	21

Acres for Grazing	
Suitable	246
Unsuitable	0
TOTAL	246

Suitable Acres/AUM = 1.42

Plant List - Vasco Caves 1996 Spring Survey

C	Genus	Species	Variety/Subspecies	Common Name
X	Achillea	millefolium		YARROW
X	Achyrrachaena	mollis		BLOW-WIVES
X	Aesculus	californica		BUCKEYE, CALIFORNIA
X	Agrostis	exarata		BENT GRASS, SPIKE REDTOP
X	Amsinckia	menziesii	intermedia	FIDDLENECK, COMMON
X	Anagallis	arvensis		PIMPERNEL, SCARLET
X	Anthriscus	caucalis		BUR-CHERVIL
X	Artemisia	californica		SAGEBRUSH, CALIFORNIA
X	Asclepias	fascicularis		MILKWEED, NARROW-LEAF
X	Astragalus	asymmetricus		MILKVETCH, SAN JUAQUIN
X	Astragalus	sp.		MILKVETCH
X	Avena	barbata		OAT, SLENDER WILD
X	Avena	fatua		OAT, WILD
X	Baccharis	pilularis		COYOTE BRUSH
X	Bellardia	trixago		BELLARDIA
X	Brassica	nigra		MUSTARD, BLACK
X	Bromus	diandrus		BROME, RIPGUT
X	Bromus	hordeaceus		BROME, SOFT
X	Bromus	madritensis	madritensis	BROME, SPANISH
X	Bromus	madritensis	rubens	BROME, RED FOXTAIL
X	Calystegia	sp.		BINDWEED OR MORNING GLORY
X	Capsella	bursa-pastoris		SHEPHERD'S PURSE
X	Carduus	pycnocephalus		THISTLE, ITALIAN
X	Carex	sp.		SEDGE
X	Castilleja	densiflora	densiflora	OWL'S CLOVER, COMMON
X	Castilleja	exserta	exserta	OWL'S CLOVER, PURPLE
X	Centaurea	solstitialis		THISTLE, YELLOW STAR
X	Cerastium	glomeratum		CHICKWEED, MOUSE-EAR
X	Chamomilla	suaveolens		PINEAPPLE WEED
X	Chenopodium	album		LAMB'S QUARTERS
X	Chenopodium	murale		GOOSEFOOT, WALL
X	Chlorogalum	pomeridianum	pomeridianum	SOAP PLANT, COMMON
X	Cirsium	vulgare		THISTLE, BULL
X	Clarkia	purpurea	quadrivulnera	CLARKIA, FOURSPOT WINECUP
X	Claytonia	perfoliata	mexicana	MINER'S LETTUCE, ANGLE-LEAF
X	Cynara	cardunculus		THISTLE, ARTICHOKE/CARDOON
X	Cyperus	eragrostis		NUTSEDGE, TALL
X	Delphinium	hesperium	pallenscens	LARKSPUR, PALE WESTERN
X	Dichelostemma	capitatum	capitatum	BLUE DICKS
X	Eremocarpus	setigerus		TURKEY MULLEIN
X	Eriogonum	sp.		BUCKWHEAT

Plant List - Vasco Caves 1996 Spring Survey

C Genus	Species	Variety/Subspecies	Common Name
X Erodium	botrys		FILAREE, LONG-BEAKED
X Erodium	cicutarium		FILAREE, RED-STEM
X Erodium	moschatum		FILAREE, WHITE-STEM
X Eschscholzia	californica		POPPY, CALIFORNIA
X Foeniculum	vulgare		FENNEL, SWEET
X Galium	aparine		BEDSTRAW, GOOSEGRASS
X Geranium	dissectum		GERANIUM, PURPLETIP CUT-LEAF
X Geranium	molle		GERANIUM, HAIRY DOVE'S FOOT
X Gnaphalium	californicum		EVERLASTING, CALIFORNIA
X Grindelia	camporum	camporum	GUMPLANT, GREAT VALLEY
? Gutierrezia	californica		MATCHWEED, CALIFORNIA
X Heliotropium	curassavicum		HELIOTROPE, SEASIDE
X Hirschfeldia	incana		MUSTARD, SHORTPOD
X Hordeum	marinum	gussoneanum	BARLEY, MEDITERRANEAN
X Hordeum	murinum	leporinum	BARLEY, HARE
X Hypochaeris	glabra		CAT'S-EAR, SMOOTH
X Hypochaeris	radicata		CAT'S-EAR, ROUGH
X Juncus	bufonius	bufonius	RUSH, TOAD
X Juncus	xiphioides		RUSH, IRISLEAF
X Lactuca	serriola		LETTUCE, PRICKLY
? Lavatera	cretica		MALLOW, CRETE
X Lepidium	latipes	latipes	PEPPERGRASS, DWARF
X Lepidium	nitidum	nitidum	PEPPERGRASS, THREADLEAF
X Leymus	triticoides		WILD RYE, WET-MEADOW
X Lolium	multiflorum		RYE GRASS, AWNED ITALIAN
X Lotus	purshianus	purshianus	CLOVER, SPANISH
X Lotus	scoparius	scoparius	DEERWEED
X Lupinus	albifrons	albifrons	LUPINE, SILVER
X Lupinus	bicolor		LUPINE, MINIATURE DOVE
? Lupinus	microcarpus	microcarpus	LUPINE, CHICK
X Lythrum	hyssopifolium		LOOSESTRIFE, GRASS POLY
? Malva	neglecta		MALLOW, COMMON UMBRELLA
X Marah	fabaceus		MANROOT, CALIFORNIA
X Marrubium	vulgare		HOREHOUND, COMMON
X Medicago	polymorpha		BUR CLOVER, CALIFORNIA
X Melica	californica		MELIC GRASS, CALIFORNIA
X Melica	torreyana		MELIC GRASS, TORREY
X Melilotus	indica		CLOVER, SOUR
X Mimulus	aurantiacus		MONKEY FLOWER, BUSH
X Mimulus	guttatus		MONKEY FLOWER, COMMON
X Nassella	pulchra		NEEDLE GRASS, PURPLE

Plant List - Vasco Caves 1996 Spring Survey

C	Genus	Species	Variety/Subspecies	Common Name
?	Oemleria	cerasiformis		OSOBERRY
X	Pellaea	mucronata	mucronata	FERN, BIRD'S-FOOT
X	Pentagramma	triangularis	triangularis	FERN, GOLDENBACK
X	Pholistoma	membranaceum		FIESTA FLOWER, WHITE
X	Picris	echioides		OX-TONGUE, BRISTLY
X	Plagiobothrys	sp.		POPCORN FLOWER
X	Plantago	erecta		PLANTAIN, CALIFORNIA DWARF
X	Poa	annua		BLUE GRASS, ANNUAL
X	Poa	secunda	secunda	BLUE GRASS, ONE-SIDE
X	Polygonum	lapathifolium		WILLOW WEED
X	Polypodium	californicum		FERN, CALIF. POLYPODY
X	Polypodium	calirhiza		FERN, POLYPODY
X	Polypogon	monspeliensis		RABBITFOOT GRASS, ANNUAL
X	Populus	fremontii	fremontii	COTTONWOOD, FREMONT
X	Potentilla	glandulosa	glandulosa	CINQUEFOIL, STICKY
X	Ptelea	crenulata		HOPTREE, WESTERN
X	Quercus	lobata		OAK, VALLEY
X	Quercus	palmeri		OAK, PALMER
X	Rorippa	nasturtium-aquaticum		WATER CRESS, WHITE
X	Rumex	conglomeratus		DOCK, GREEN
X	Rumex	crispus		DOCK, CURLY
X	Salix	lasiolepis		WILLOW, ARROYO
X	Salsola	tragus		THISTLE, RUSSIAN
X	Sambucus	mexicana		ELDERBERRY, BLUE
X	Scirpus	acutus	occidentalis	BULRUSH, HARDSTEM
X	Scrophularia	californica	californica	FIGWORT, CALIFORNIA
X	Silene	gallica		PINK, WINDMILL
X	Silybum	marianum		THISTLE, MILK
X	Solanum	americanum		NIGHTSHADE, SMALL-FLOWER
X	Solanum	umbelliferum		NIGHTSHADE, BLUE WITCH
X	Sonchus	asper	asper	SOW THISTLE, PRICKLY
X	Stachys	albens		HEDGENETTLE, WHITESTEM
X	Stellaria	media		CHICKWEED, COMMON
X	Toxicodendron	diversiloba		POISON OAK, WESTERN
X	Trifolium	willdenovii		CLOVER, TOMCAT
X	Triteleia	laxa		ITHURIEL'S SPEAR
X	Typha	domingensis		CATTAIL, SOUTHERN
X	Urtica	dioica	holosericea	NETTLE, CREEK STINGING
X	Urtica	urens		NETTLE, DWARF STINGING
X	Verbena	lasiolepis	scabrida	VERBENA, ROBUST
X	Vulpia	bromoides		FESCUE, SIX-WEEKS

Plant List - Vasco Caves 1996 Spring Survey

C Genus	Species	Variety/Subspecies	Common Name
X Vulpia	sp.		FESCUE, ANNUAL
X Xanthium	strumarium		COCKLEBUR

California Native Plant Society's
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Wide Tabular Report of Selected Plants by Scientific Name
Possible RTE Plants at Vasco Caves based on Quad & Habitat

Scientific Name/Family	Counties	Quads	Habitat	Blooms	CNPS	R-E-D	St/Fed	Notes
<i>ASTRAGALUS TENER</i> VAR. <i>TENER</i> Fabaceae	ALA*, CCA*, MER, MNT*, NAP, SBT*, SCL*, SFO*, SJQ*, SOL, SON*, STA*, YOL	365B*, 385B*, 385C*, 403A, 423B*, 423C, 423D, 424A*, 427B*, 428A*, 445B*, 447A*, 447B*, 447D*, 462A*, 463C*, 465A*, 465C*, 466A*, 466C*, 466D*, 481B, 481D, 482A, 483A, 484B*, 497B, 498A*, 498C, 498D, 499D*, 500D*, 513B, 513C, 514A*, 514D*	Plyas, VFGrs (adobe clay), VnPls (alkaline)	Mar-Jun	1B	3-2-3		Last Bay Area collection in 1959. Threatened by habitat destruction, especially agricultural conversion, and protected only at Jepson Prairie Preserve (TNC), SOL Co. See Proceedings of the American Academy of Arts and Sciences 6:206 (1864) for original description, and Systematic Botany 17(3):367-379 (1992) for distributional information.
<i>ATRIPLEX CORDULATA</i> Chenopodiaceae	ALA, CCA, BUT, FRE, GLE, KNG, KRN, MAD, MER, SJQ*, SOL, STA*, TUL, YOL*	215B, 216A, 216C, 264B, 287B, 287C, 288A, 288B, 288C, 288D, 334C, 359A*, 359B, 360A, 380C, 381A*, 381B, 381D, 401B*, 401D*, 403A, 403B*, 403C*, 403D, 422C, 423D, 424A*, 445B, 463C, 463D, 464A, 481A, 481C, 481D, 498D, 513C*, 561D, 562B	ChScr, Medws, VFGrs (sandy) / saline or alkaline	Apr-Oct	1B	2-2-3	/C2	Need quads for KNG and SJQ counties. Similar to <i>A. coronata</i> var. <i>coronata</i> .
<i>ATRIPLEX DEPRESSA</i> Chenopodiaceae	ALA, BUT, CCA, COL, FRE, GLE, KRN, MAD, MER, SOL, STA*, TUL, YOL	265A, 288C, 334B*, 335B*, 358C*, 359A, 359B, 359D*, 360A, 381A*, 401B*, 401D*, 402A, 423B*, 423D, 424A*, 443B*, 445B, 463C, 463D, 481B, 481D, 498D, 513B, 514A*, 546A, 546D, 547A, 561D, 562B, 562D, 578C*	ChScr, Plyas, VFGrs, VnPls / alkaline, clay	May-Oct	1B	2-2-3		Threatened by development, grazing, and trampling. Closely related to <i>A. minuscula</i> and <i>A. parishii</i> ; a synonym of the latter in <i>A California Flora</i> (1959) by P. Munz. See Pittonia 2:304 (1892) for original description.
<i>ATRIPLEX JOAQUINIANA</i> Chenopodiaceae	ALA, CCA, COL, GLE, MER, NAP, SAC, SBT, SCL*, SJQ*, SOL, TUL*, YOL	340D, 385B*, 385C, 403A, 403B, 406D*, 423C, 427B*, 445B, 446A, 462A*, 463A, 463B, 463C, 463D, 464A, 464B*, 464C*, 465D*, 480B*, 480C*, 481B, 481D, 483A, 498C*, 498D, 499D*, 500D, 511A,	ChScr, Medws, VFGrs / alkaline	Apr-Sep	1B	2-2-3	/C2	Need historical quads for TUL Co. Threatened by grazing, agriculture, and development.

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Possible RTE Plants at Vasco Caves based on Quad & Habitat

Scientific Name/Family	Counties	Quads	Habitat	Blooms	CNPS	R-E-D	St/Fed	Notes
<i>ATRIPLEX JOAQUINIANA</i> (cont.)		513B, 513C, 530B*, 547A, 547C, 562B, 564A, 578C*						
<i>BLEPHARIZONIA PLUMOSA</i> SSP. <i>PLUMOSA</i> Asteraceae	ALA, CCA, SJQ*, STA*, SOL*	443C*, 444B*, 445B, 446A, 462C*, 463B, 463C, 465A(*?), 481C(*?), 481D(*?)	VFGrs	Jul-Oct	1B	3-3-3		Need historical quads for SOL Co. Historical occurrences probably extirpated by agriculture and non-native plants; also threatened by residential development. See Proceedings of the California Academy of Sciences I 5:49 (1873) for original description.
<i>DELPHINIUM RECURVATUM</i> Ranunculaceae	ALA, CCA, COL, FRE, KNG, KRN, MER, SLO, SOL, TUL	217B, 217C, 218A, 218B, 218D, 240C, 240D, 241C, 241D, 242D, 243C, 243D, 264A, 264D, 265A, 265B, 265D, 267A, 287B, 288A, 288D, 290C, 291B, 291D, 312B, 315C, 338D, 359B, 359D, 383B, 463C, 463D, 498B, 547D	ChScr, CmWld, VFGrs, VnPls / alkaline	Mar-May	1B	1-2-3	/C2	Many historical occurrences need field surveys. Much habitat converted to agriculture; also threatened by grazing. Abundant on Carrizo Plain in 1995.
<i>ESCHSCHOLZIA RHOMBIPETALA</i> Papaveraceae	ALA*, CCA*, COL*, SLO, STA*	243B*, 243C, 244C?*, 424B*, 443C*, 445A*, 463C*, 464A*, 481D*, 563D*	VFGrs (alkaline, clay)	Mar-Apr	1A	*	/C2	Rediscovered on Carrizo Plain by David Keil in 1992; not seen in 1995 surveys. Historical occurrence for SJQ Co. from literature lacks documentation; occurrence from La Panza, SLO Co. (244C) probably misidentified <i>E. lemmonii</i> ssp. <i>lemmonii</i> . Threatened by agriculture and grazing.
<i>HELIANTHELLA CASTANEA</i> Asteraceae	ALA, CCA, MRN*, SFO*, SMT	446B, 447A, 448B, 463C, 464A, 464B, 464C, 464D, 465A, 465B, 465C*, 465D, 466A, 467A*, 482C, 483D	BUFrS, Chprl, CmWld, CoScr, RpWld, VFGrs	Apr-Jun	1B	3-2-3	/C2	Threatened by urbanization, grazing, and fire suppression.
<i>LASTHENIA CONJUGENS</i> Asteraceae	ALA*, CCA, MEN*, NAP, SBA*, SCL*, SOL	142A*, 143A*, 427D*, 447D*, 463C*, 465A*, 481B, 481D, 482A, 482C, 483A, 498C, 499B*, 499C*, 500D*, 517D*, 537B*	CmWld, VFGrs, VnPls / mesic	Mar-Jun	1B	3-3-3	/PE	Known from approximately ten occurrences after comprehensive 1993-1995 surveys. Many historical occurrences extirpated by development and agriculture; also threatened by overgrazing and non-native plants.
<i>TROPIDOCARPUM CAPPARIDEUM</i> Brassicaceae	ALA*, CCA*, GLE*, MNT*, SCL*, SJQ*	318C*, 428B*, 428D*, 444B*, 445A*, 445B*, 463A*, 463C*, 463D*, 464B*, 578C*	VFGrs (alkaline hills)	Mar-Apr	1A	*	/C2*	Recent attempts to rediscover this plant have been unsuccessful.

APPENDIX E: WILDLIFE CHECKLIST: VASCO CAVES 1997

CLASS	COMMONNAME	LATIN NAME	OBS	EXP	BREEDING	COMMENTS
Amphibians	Arboreal Salamander	<i>Aneides lugubris</i>				
Amphibians	Bullfrog	<i>Rana catesbeiana</i>				
Amphibians	California Newt, Coast Range	<i>Taricha torosa</i>				
Amphibians	California Slender Salamander	<i>Batrachoseps attenuatus</i>		X		
Amphibians	Ensatina, Yellow-eyed	<i>Ensatina eschscholtzi</i>				
Amphibians	Foothill Yellow-legged Frog	<i>Rana boylei</i>				UNLIKELY
Amphibians	Pacific Treefrog	<i>Hyla regilla</i>	X		X	POND 4 ONLY
Amphibians	Red-legged Frog, California	<i>Rana aurora draytonii</i>	X		X	PONDS 3 AND 4
Amphibians	Rough-skinned Newt, Northern	<i>Taricha granulosa</i>				
Amphibians	Tiger Salamander, California	<i>Ambystoma tigrinum californiense</i>	X		X	POND 4
Amphibians	Western Spadefoot Toad	<i>Scaphiopus hammondi</i>				
Amphibians	Western Toad, California	<i>Bufo boreas</i>		X		
Birds	Acorn Woodpecker	<i>Melanerpes formicivorus</i>				
Birds	Allen's Hummingbird	<i>Selasphorus sasin</i>		X		
Birds	American Avocet	<i>Recurvirostra americana</i>				
Birds	American Bittern	<i>Botaurus lentiginosus</i>				
Birds	American Coot	<i>Fulica americana</i>				
Birds	American Crow	<i>Corvus brachyrhynchos</i>				
Birds	American Dipper	<i>Cinclus mexicanus</i>				
Birds	American Goldfinch	<i>Carduelis tristis</i>		X		
Birds	American Green-winged Teal	<i>Anas crecca</i>				
Birds	American Kestrel	<i>Falco sparverius</i>	X		X	
Birds	American Robin	<i>Turdus migratorius</i>		X	X	
Birds	American White Pelican	<i>Pelecanus erythrorhynchos</i>				
Birds	American Wigeon	<i>Anas americana</i>				
Birds	Anna's Hummingbird	<i>Calypte anna</i>	X		X	
Birds	Arctic Loon	<i>Gavia arctica</i>				
Birds	Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>				
Birds	Baird's Sandpiper	<i>Calidris bairdii</i>				
Birds	Bald Eagle	<i>Haliaeetus leucocephalus</i>				
Birds	Band-tailed Pigeon	<i>Columba fasciata</i>		X		
Birds	Bank Swallow	<i>Riparia riparia</i>				
Birds	Barn Swallow	<i>Hirundo rustica</i>	X			
Birds	Barrow's Goldeneye	<i>Bucephala islandica</i>				
Birds	Belted Kingfisher	<i>Ceryle alcyon</i>				
Birds	Bewick's Wren	<i>Thryomanes bewickii</i>	X		X	
Birds	Black Phoebe	<i>Sayornis nigricans</i>	X		X	
Birds	Black Scoter	<i>Melanitta nigra</i>				
Birds	Black Tern	<i>Chlidonias niger</i>				
Birds	Black Turnstone	<i>Arenaria melanocephala</i>				
Birds	Black-bellied Plover	<i>Pluvialis squatarola</i>				
Birds	Black-chinned Hummingbird	<i>Archilochus alexandri</i>				
Birds	Black-chinned Sparrow	<i>Spizella atrogularis</i>				
Birds	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>				
Birds	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>				
Birds	Black-necked Stilt	<i>Himantopus mexicanus</i>				
Birds	Black-throated Gray Warbler	<i>Dendroica nigrescens</i>				
Birds	Blue Grosbeak	<i>Guiraca caerulea</i>				
Birds	Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>				
Birds	Blue-winged Teal	<i>Anas discors</i>				
Birds	Bonaparte's Gull	<i>Larus philadelphia</i>				
Birds	Brandt's Cormorant	<i>Phalacrocorax penicillatus</i>				
Birds	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		X		
Birds	Brown Creeper	<i>Certhia americana</i>				
Birds	Brown Pelican	<i>Pelecanus occidentalis</i>				
Birds	Brown Towhee	<i>Pipilo fuscus</i>	X		X	
Birds	Brown-headed Cowbird	<i>Molothrus ater</i>		X		
Birds	Bufflehead	<i>Bucephala albeola</i>				
Birds	Burrowing Owl	<i>Athene (Speotyto) cunicularia</i>	X		X	
Birds	Bushtit	<i>Psaltirparus minimus</i>				
Birds	California Black Rail	<i>Laterallus jamaicensis coturniculus</i>				
Birds	California Clapper Rail	<i>Rallus longirostris obsoletus</i>				
Birds	California Gull	<i>Larus californicus</i>				
Birds	California Quail	<i>Callipepla californica</i>	X		X	
Birds	California Thrasher	<i>Toxostoma redivivum</i>		X		
Birds	Calliope Hummingbird	<i>Stellula calliope</i>		X		
Birds	Canada Goose	<i>Branta canadensis</i>				
Birds	Canvasback	<i>Aythya valisineria</i>				
Birds	Canyon Wren	<i>Catherpes mexicanus</i>				
Birds	Caspian Tern	<i>Sterna caspia</i>				
Birds	Cattle Egret	<i>Bubulcus ibis</i>				
Birds	Cedar Waxwing	<i>Bombicilla cedrorum</i>				
Birds	Chestnut-backed Chickadee	<i>Parus rufescens</i>				

NOTE: OBS = OBSERVED, EXP = EXPECTED

APPENDIX E: WILDLIFE CHECKLIST: VASCO CAVES 1997

CLASS	COMMONNAME	LATIN NAME	OBS	EXP	BREEDING	COMMENTS
Birds	Chipping Sparrow	<i>Spizella passerina</i>				
Birds	Cinnamon Teal	<i>Anas cyanoptera</i>				
Birds	Cliff Swallow	<i>Hirundo pyrrhonota</i>	X		X	
Birds	Common Barn Owl	<i>Tyto alba</i>	X		X	SEVERAL NESTS IN ROCKS
Birds	Common Goldeneye	<i>Bucephala clangula</i>				
Birds	Common Loon	<i>Gavia immer</i>				
Birds	Common Merganser	<i>Mergus merganser</i>				
Birds	Common Moorhen (Gallinule)	<i>Gallinula chloropus</i>				
Birds	Common Murre	<i>Uria aalge</i>				
Birds	Common Poorwill	<i>Phalaenoptilus nuttallii</i>				
Birds	Common Raven	<i>Corvus corax</i>	X		X	SEVERAL NESTS IN ROCKS
Birds	Common Snipe	<i>Gallinago gallinago</i>				
Birds	Common Tern	<i>Sterna hirundo</i>				
Birds	Common Yellowthroat	<i>Geothlypis trichas</i>				
Birds	Cooper's Hawk	<i>Accipiter cooperii</i>	X			
Birds	Dark-eyed (Oregon) Junco	<i>Junco hyemalis</i>		X		
Birds	Dark-eyed (Slate-colored) Junco	<i>Junco hyemalis</i>				
Birds	Double-crested Cormorant	<i>Phalacrocorax auritus</i>				
Birds	Downy Woodpecker	<i>Picoides pubescens</i>				
Birds	Dunlin	<i>Calidris alpina</i>				
Birds	Dusky Flycatcher	<i>Empidonax oberholseri</i>				
Birds	Eared Grebe	<i>Podiceps nigricollis</i>				
Birds	Elegant Tern	<i>Sterna elegans</i>				
Birds	Eurasian Wigeon	<i>Anas penelope</i>				
Birds	European Starling	<i>Sturnus vulgaris</i>	X		X	
Birds	Ferruginous Hawk	<i>Buteo regalis</i>	X			WINTERING ONLY
Birds	Forster's Tern	<i>Sterna forsteri</i>				
Birds	Fox Sparrow	<i>Passerella iliaca</i>				
Birds	Gadwall	<i>Anas strepera</i>				
Birds	Glaucous Gull	<i>Larus hyperboreus</i>				
Birds	Glaucous-winged Gull	<i>Larus glaucescens</i>				
Birds	Golden Eagle	<i>Aquila chrysaetos</i>	X		X	RECENT NEST IN ROCKS
Birds	Golden-crowned Kinglet	<i>Regulus satrapa</i>				
Birds	Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		X		WINTERING
Birds	Grasshopper Sparrow	<i>Ammodramus savannarum</i>		X		
Birds	Great Blue Heron	<i>Ardea herodias</i>				
Birds	Great Egret	<i>Casmerodius albus</i>				
Birds	Great Horned Owl	<i>Bubo virginianus</i>	X		X	NEST IN OLD EAGLE NEST
Birds	Greater Roadrunner	<i>Geococcyx californianus</i>				
Birds	Greater Scaup	<i>Aythya marila</i>				
Birds	Greater White-fronted Goose	<i>Anser albifrons</i>				
Birds	Greater Yellowlegs	<i>Tringa melanoleuca</i>				
Birds	Green-backed Heron	<i>Butorides striatus</i>				
Birds	Hairy Woodpecker	<i>Picoides villosus</i>				
Birds	Hammond's Flycatcher	<i>Empidonax hammondi</i>				
Birds	Heermann's Gull	<i>Larus heermanni</i>				
Birds	Hermit Thrush	<i>Catharus guttatus</i>				
Birds	Hermit Warbler	<i>Dendroica occidentalis</i>				
Birds	Herring Gull	<i>Larus argentatus</i>				
Birds	Hooded Merganser	<i>Lophodytes cucullatus</i>				
Birds	Hooded Oriole	<i>Icterus cucullatus</i>				
Birds	Horned Grebe	<i>Podiceps auritus</i>				
Birds	Horned Lark	<i>Eremophila alpestris</i>	X		X	
Birds	House Finch	<i>Carpodacus mexicanus</i>		X	X	
Birds	House Sparrow	<i>Passer domesticus</i>				
Birds	House Wren	<i>Troglodytes aedon</i>				
Birds	Hutton's Vireo	<i>Vireo huttoni</i>				
Birds	Killdeer	<i>Charadrius vociferus</i>		X		
Birds	Lark Sparrow	<i>Chondestes grammacus</i>	X		X	
Birds	Lawrence's Goldfinch	<i>Carduelis lawrencei</i>				
Birds	Lazuli Bunting	<i>Passerina amoena</i>				
Birds	Least Sandpiper	<i>Calidris minutilla</i>				
Birds	Least Tern	<i>Sterna antillarum browni</i>				
Birds	Lesser Golden-Plover	<i>Pluvialis dominica</i>				
Birds	Lesser Goldfinch	<i>Carduelis psaltria</i>		X		
Birds	Lesser Scaup	<i>Aythya affinis</i>				
Birds	Lesser Yellowlegs	<i>Tringa flavipes</i>				
Birds	Lewis' Woodpecker	<i>Melanerpes lewis</i>				
Birds	Lincoln's Sparrow	<i>Melospiza lincolnii</i>				
Birds	Loggerhead Shrike	<i>Lanius ludovicianus</i>	X		X	
Birds	Long-billed Curlew	<i>Numenius americanus</i>				
Birds	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>				
Birds	Long-eared Owl	<i>Asio otus</i>	X			WINTERING IN WILLOWS BELOW LOCUS 3 & 4
Birds	MacGillivray's Warbler	<i>Oporornis tolmiei</i>		X		
NOTE:		OBS = OBSERVED, EXP = EXPECTED				

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CLASS	COMMONNAME	LATIN NAME	OBS	EXP	BREEDING	COMMENTS
Birds	Mallard	<i>Anas platyrhynchos</i>	X			POSSIBLY NEST ALONG PONDS
Birds	Marbled Godwit	<i>Limosa fedoa</i>				
Birds	Marsh Wren	<i>Cistothorus palustris</i>				
Birds	Merlin	<i>Falco columbarius</i>		X		WINTER ONLY
Birds	Mew Gull	<i>Larus canus</i>				
Birds	Mountain Bluebird	<i>Sialia currucoides</i>		X		WINTER ONLY
Birds	Mourning Dove	<i>Zenaida macroura</i>	X		X	
Birds	Nashville Warbler	<i>Vermivora ruficapilla</i>				
Birds	Northern (Bullock's) Oriole	<i>Icterus galbula</i>		X	X	
Birds	Northern Flicker	<i>Colaptes auratus</i>		X	X	
Birds	Northern Harrier	<i>Circus cyaneus</i>	X			
Birds	Northern Mockingbird	<i>Mimus polyglottos</i>	X			
Birds	Northern Pintail	<i>Anas acuta</i>				
Birds	Northern Pygmy-Owl	<i>Glaucidium gnoma</i>				
Birds	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		X		
Birds	Northern Saw-whet Owl	<i>Aegolius acadicus</i>				
Birds	Northern Shoveler	<i>Anas clypeata</i>				
Birds	Nuttall's Woodpecker	<i>Picoides nuttallii</i>		X	X	
Birds	Oldsquaw	<i>Clangula hyemalis</i>				
Birds	Olive-sided Flycatcher	<i>Contopus borealis</i>				
Birds	Orange-crowned Warbler	<i>Vermivora celata</i>				
Birds	Osprey	<i>Pandion haliaetus</i>				
Birds	Parasitic Jaeger	<i>Stercorarius parasiticus</i>				
Birds	Pectoral Sandpiper	<i>Calidris melanotos</i>				
Birds	Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>				
Birds	Peregrine Falcon	<i>Falco peregrinus</i>		X		
Birds	Phainopepla	<i>Phainopepla nitens</i>				
Birds	Pied-billed Grebe	<i>Podilymbus podiceps</i>				
Birds	Pine Siskin	<i>Carduelis pinus</i>				
Birds	Plain Titmouse	<i>Parus inornatus</i>				
Birds	Prairie Falcon	<i>Falco mexicanus</i>	X		POSSIBLE	IMMATURE BIRD SEEN IN JULY ON LOCUS 9
Birds	Purple Finch	<i>Carpodacus purpureus</i>				
Birds	Red Knot	<i>Calidris canutus</i>				
Birds	Red-breasted Merganser	<i>Mergus serrator</i>				
Birds	Red-breasted Nuthatch	<i>Sitta canadensis</i>				
Birds	Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>				
Birds	Red-necked Grebe	<i>Podiceps grisegena</i>				
Birds	Red-necked Phalarope	<i>Phalaropus lobatus</i>				
Birds	Red-shouldered Hawk	<i>Buteo lineatus</i>				
Birds	Red-tailed Hawk	<i>Buteo jamaicensis</i>	X		X	NESTING IN ROCKS
Birds	Red-throated Loon	<i>Gavia stellata</i>				
Birds	Red-winged Blackbird	<i>Agelaius phoeniceus</i>		X		
Birds	Redhead	<i>Aythya americana</i>				
Birds	Ring-billed Gull	<i>Larus delawarensis</i>				
Birds	Ring-necked Duck	<i>Aythya collaris</i>				
Birds	Ring-necked Pheasant	<i>Phasianus colchicus</i>				
Birds	Rock Dove (Domestic Pigeon)	<i>Columba livia</i>	X		X	NESTING IN ROCKS
Birds	Rock Wren	<i>Salpinctes obsoletus</i>	X		X	
Birds	Ross' Goose	<i>Chen rossii</i>				
Birds	Rough-legged Hawk	<i>Buteo lagopus</i>		X		WINTER ONLY
Birds	Ruby-crowned Kinglet	<i>Regulus calendula</i>				
Birds	Ruddy Duck	<i>Oxyura jamaicensis</i>				
Birds	Ruddy Turnstone	<i>Arenaria interpres</i>				
Birds	Rufous Hummingbird	<i>Selasphorus rufus</i>		X		
Birds	Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>				
Birds	Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>				
Birds	Sage Sparrow	<i>Amphispiza belli</i>				
Birds	Sanderling	<i>Calidris alba</i>				
Birds	Sandhill Crane	<i>Grus canadensis</i>				
Birds	Savannah Sparrow	<i>Passerculus sandwichensis</i>		X	X	
Birds	Saltmarsh Common Yellowthroat	<i>Geothlypis trichas sinuosa</i>				
Birds	Say's Phoebe	<i>Sayornis saya</i>		X		
Birds	Scrub Jay	<i>Aphelocoma coerulescens</i>	X		X	
Birds	Semipalmated Plover	<i>Charadrius semipalmatus</i>				
Birds	Sharp-shinned Hawk	<i>Accipiter striatus</i>	X			MIGRATORY
Birds	Short-billed Dowitcher	<i>Limnodromus griseus</i>				
Birds	Short-eared Owl	<i>Asio flammeus</i>				
Birds	Snow Goose	<i>Chen caerulescens</i>				
Birds	Snowy Egret	<i>Egretta thula</i>				
Birds	Snowy Plover	<i>Charadrius alexandrinus nivosus</i>				
Birds	Solitary Vireo	<i>Vireo solitarius</i>				
Birds	Song Sparrow	<i>Melospiza melodia</i>				
Birds	Sora	<i>Porzana carolina</i>				
Birds	Spotted Sandpiper	<i>Actitis macularia</i>				

NOTE: OBS = OBSERVED, EXP = EXPECTED

APPENDIX E: WILDLIFE CHECKLIST: VASCO CAVES 1997

CLASS	COMMONNAME	LATIN NAME	OBS	EXP	BREEDING	COMMENTS
Birds	Stellar's Jay	<i>Cyanocitta stelleri</i>				
Birds	Suisun Song Sparrow	<i>Melospiza melodia</i>				
Birds	Surf Scoter	<i>Melanitta perspicillata</i>				
Birds	Surfbird	<i>Aphriza virgata</i>				
Birds	Swainson's Thrush	<i>Catharus ustulatus</i>				
Birds	Thayer's Gull	<i>Larus thayeri</i>				
Birds	Townsend's Solitaire	<i>Myadestes townsendi</i>				
Birds	Townsend's Warbler	<i>Dendroica townsendi</i>				
Birds	Tree Swallow	<i>Tachycineta bicolor</i>		X		
Birds	Tricolored Blackbird	<i>Agelaius tricolor</i>				
Birds	Tundra (Whistling) Swan	<i>Cygnus columbianus</i>				
Birds	Turkey Vulture	<i>Cathartes aura</i>	X			
Birds	Varied Thrush	<i>Ixoreus naevius</i>				
Birds	Vaux's Swift	<i>Chaetura vauxi</i>				
Birds	Violet-green Swallow	<i>Tachycineta thalassina</i>		X		
Birds	Virginia Rail	<i>Rallus limicola</i>				
Birds	Wandering Tattler	<i>Heteroscelus incanus</i>				
Birds	Warbling Vireo	<i>Vireo gilvus</i>				
Birds	Water Pipet	<i>Anthus spinoletta</i>				
Birds	Western Bluebird	<i>Sialia mexicana</i>	X		X	
Birds	Western Flycatcher	<i>Empidonax difficilis</i>				
Birds	Western Grebe	<i>Aechmophorus occidentalis</i>				
Birds	Western Gull	<i>Larus occidentalis</i>				
Birds	Western Kingbird	<i>Tyrannus verticalis</i>		X		
Birds	Western Meadowlark	<i>Sturnella neglecta</i>	X		X	
Birds	Western Sandpiper	<i>Calidris mauri</i>				
Birds	Western Screech-Owl	<i>Otus kennicottii</i>	X			ADULT HEARD CALLING (JULY 1996)
Birds	Western Tanager	<i>Piranga ludoviciana</i>				
Birds	Western Wood-Pewee	<i>Contopus sordidulus</i>				
Birds	Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>				
Birds	Whimbrel	<i>Numenius phaeopus</i>				
Birds	White-breasted Nuthatch	<i>Sitta carolinensis</i>				
Birds	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		X		
Birds	White-throated Sparrow	<i>Zonotrichia albicollis</i>				
Birds	White-throated Swift	<i>Aeronautes saxatalis</i>	X		X	
Birds	White-tailed Kite	<i>Elanus leucurus</i>	X		X	
Birds	Wild Turkey	<i>Meleagris gallopavo</i>				
Birds	Willet	<i>Catoptrophorus semipalmatus</i>				
Birds	Willow Flycatcher	<i>Empidonax traillii</i>				
Birds	Wilson's Phalarope	<i>Phalaropus tricolor</i>				
Birds	Wilson's Warbler	<i>Wilsonia pusilla</i>				
Birds	Winter Wren	<i>Troglodytes troglodytes</i>				
Birds	Wood Duck	<i>Aix sponsa</i>				
Birds	Wrentit	<i>Chamaea fasciata</i>				
Birds	Yellow Warbler	<i>Dendroica petechia brewsteri</i>				
Birds	Yellow-billed Magpie	<i>Pica nuttalli</i>		X		
Birds	Yellow-breasted Chat	<i>Icteria virens</i>				
Birds	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>				
Birds	Yellow-rumped (Audubon's) Warbler	<i>Dendroica coronata</i>		X		WINTER
Birds	Yellow-rumped (Myrtle) Warbler	<i>Dendroica coronata</i>		X		WINTER
Mammals	Audubon Cottontail	<i>Sylvilagus audubonii</i>	X		X	FEMALE WITH NEWBORN YOUNG 3/26/97
Mammals	Badger	<i>Taxidea taxus</i>		X	X	
Mammals	Big Brown Bat	<i>Eptesicus fuscus</i>				
Mammals	Black Rat	<i>Rattus rattus</i>				
Mammals	Black-tailed Hare	<i>Lepus californicus</i>	X		X	
Mammals	Bobcat	<i>Lynx rufus</i>	X			
Mammals	Botta Pocket Gopher	<i>Thomomys bottae</i>		X	X	
Mammals	Brazilian Free-tailed Bat	<i>Tadarida brasiliensis</i>		X		
Mammals	Broad-footed Mole	<i>Scapanus latimanus</i>		X	X	
Mammals	Brush Mouse	<i>Peromyscus boylii</i>		X	X	
Mammals	Brush Rabbit	<i>Sylvilagus bachmani</i>				
Mammals	California Ground Squirrel	<i>Spermophilus beecheyi</i>	X		X	
Mammals	California Meadow Mouse	<i>Microtus californicus</i>		X	X	
Mammals	California Mouse	<i>Peromyscus californicus</i>		X	X	
Mammals	California Myotis	<i>Myotis californicus</i>		X	X	
Mammals	California Pocket Mouse	<i>Perognathus californicus</i>		X	X	
Mammals	Common Opossum	<i>Didelphis marsupialis</i>				
Mammals	Coyote	<i>Canis latrans</i>	X		X	
Mammals	Deer Mouse	<i>Peromyscus maniculatus</i>		X	X	
Mammals	Desert Wood Rat	<i>Neotoma lepida</i>		X	X	
Mammals	Dusky-footed Wood Rat	<i>Neotoma fuscipes</i>		X	X	
Mammals	Fox Squirrel	<i>Sciurus niger</i>				
Mammals	Fringed Myotis	<i>Myotis thysanodes</i>				
Mammals	Gray Fox	<i>Urocyon cinereoargenteus</i>		X	X	
Mammals	Hairy-winged Myotis	<i>Myotis volans</i>				
NOTE:		OBS = OBSERVED, EXP = EXPECTED				

APPENDIX E: WILDLIFE CHECKLIST: VASCO CAVES 1997

CLASS	COMMONNAME	LATIN NAME	OBS	EXP	BREEDING	COMMENTS
Mammals	Heermann Kangaroo Rat	<i>Dipodomys heermanni</i>				
Mammals	Hoary Bat	<i>Lasiurus cinereus</i>				
Mammals	House Mouse	<i>Mus domesticus</i>		X	X	
Mammals	Kit Fox, San Joaquin	<i>Vulpes macrotis</i>	X		X	LISTED IN CDF&G RECORDS
Mammals	Little Pocket Mouse	<i>Perognathus longimembris</i>				
Mammals	Long-eared Myotis	<i>Myotis evotis</i>				
Mammals	Long-tailed Weasel	<i>Mustela frenata</i>				
Mammals	Lump-nosed Bat	<i>Plecotus townsendii</i>				
Mammals	Mountain Lion	<i>Felis concolor</i>				
Mammals	Mule Deer	<i>Odocoileus hemionus</i>		X		
Mammals	Muskrat	<i>Ondatra zibethica</i>				
Mammals	Norway Rat	<i>Rattus norvegicus</i>				
Mammals	Ornate Shrew	<i>Sorex ornatus</i>				
Mammals	Pallid Bat	<i>Antrozous pallidus</i>				
Mammals	Pig, Feral	<i>Sus scrofa</i>				
Mammals	Pinyon Mouse	<i>Peromyscus trueii</i>				
Mammals	Raccoon	<i>Procyon lotor</i>	X		X	
Mammals	Red Bat	<i>Lasiurus borealis</i>		X		MIGRATORY SPECIES
Mammals	Red Fox	<i>Vulpes fulva</i>		X		
Mammals	Ringtail	<i>Bassariscus astutus</i>				
Mammals	Salt Marsh Harvest Mouse	<i>Reithrodontomys raviventris</i>				
Mammals	Saltmarsh Wandering Shrew	<i>Sorex vagrans halicoetes</i>				
Mammals	San Pablo Vole	<i>Microtus californicus</i>				
Mammals	Silvery-haired Bat	<i>Lasionycteris noctivagans</i>				
Mammals	Spotted Skunk	<i>Spilogale putorius</i>				
Mammals	Striped Skunk	<i>Mephitis mephitis</i>		X	X	
Mammals	Trowbridge Shrew	<i>Sorex trowbridgii</i>		X	X	
Mammals	Vagrant Shrew	<i>Sorex vagrans</i>				
Mammals	Western Harvest Mouse	<i>Reithrodontomys megalotis</i>		X	X	
Mammals	Western Pipistrelle	<i>Pipistrellus hesperus</i>		X		
Mammals	Yuma Myotis	<i>Myotis yumanensis</i>		X		
Reptiles	Blunt-nosed Leopard Lizard	<i>Gambelia silus</i>				
Reptiles	California Black-headed Snake	<i>Tantilla planiceps</i>				
Reptiles	California Legless Lizard, Silvery	<i>Anniella pulchra</i>				
Reptiles	California Mountain Kingsnake, Coast	<i>Lampropeltis zonata</i>				
Reptiles	Coachwhip, San Joaquin Whipsnake	<i>Masticophis flagellum</i>				
Reptiles	Coast Horned Lizard, California	<i>Phrynosoma coronatum</i>		X		UNLIKELY
Reptiles	Common Garter Snake, San Francisco	<i>Thamnophis sirtalis</i>				
Reptiles	Common Garter Snake, Valley	<i>Thamnophis sirtalis</i>		X		
Reptiles	Common Garter Snake, Calif. Red-sided	<i>Thamnophis sirtalis</i>				
Reptiles	Common Kingsnake, California	<i>Lampropeltis getulus</i>		X	X	
Reptiles	Gilbert's Skink, Variegated	<i>Eumeces gilberti</i>		X	X	
Reptiles	Glossy Snake, California	<i>Arizona elegans</i>				
Reptiles	Gopher Snake, Pacific	<i>Pituophis melanoleucus</i>	X		X	
Reptiles	Long-nosed Snake, Western	<i>Rhinocheilus lecontei</i>				
Reptiles	Night Snake, California	<i>Hypsiglena torquata</i>				
Reptiles	Northern Alligator Lizard, SF	<i>Gerrhonotus coeruleus</i>				
Reptiles	Racer, Western Yellow-bellied	<i>Coluber constrictor</i>		X	X	
Reptiles	Ringneck Snake, Pacific	<i>Diadophis punctatus</i>		X	X	
Reptiles	Rubber Boa, Pacific	<i>Charina bottae</i>				
Reptiles	Sagebrush Lizard, Northern	<i>Sceloporus graciosus</i>	X		X	
Reptiles	Sharp-tailed Snake	<i>Contia tenuis</i>				
Reptiles	Side-blotched Lizard, California	<i>Uta stansburiana</i>				
Reptiles	Southern Alligator Lizard, Calif.	<i>Gerrhonotus multicarinatus</i>		X	X	
Reptiles	Striped Racer, Alameda	<i>Masticophis lateralis lateralis</i>				
Reptiles	Western Aquatic Garter Snake	<i>Thamnophis couchi</i>				
Reptiles	Western Aquatic Garter Snake, S.Cruz	<i>Thamnophis couchi</i>				
Reptiles	Western Fence Lizard, Northwestern	<i>Sceloporus occidentalis</i>	X		X	
Reptiles	Western Pond Turtle	<i>Clemmys marmorata</i>				
Reptiles	Western Rattlesnake, North.Pacific	<i>Crotalus viridis</i>	X		X	
Reptiles	Western Skink, Western subspp.	<i>Eumeces skiltonianus</i>				
Reptiles	Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>		X	X	
Reptiles	Western Whiptail, California	<i>Cnemidophorus tigris</i>		X	X	
Reptiles	Whipsnake, Alameda	<i>Masticophis lateralis euryxanthus</i>				
Invertebrates	Longhorned Fairy Shrimp	<i>Branchinecta longiantenna</i>	X		X	
Invertebrates	Vernal Pool Fairy Shrimp	<i>Branchinecta lynchi</i>	X		X	
Invertebrates	California Linderella	<i>Linderella occidentalis</i>	X		X	
NOTE: OBS = OBSERVED, EXP = EXPECTED						

Appendix F

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APPENDIX G

LONG TERM MITIGATION REQUIREMENTS for the Vasco Caves Resource Management Plan

INTRODUCTION: Ongoing mitigation measures for which CCWD has lead responsibility as part of the management of Vasco Caves, stem from its Los Vaqueros Project (LVP) environmental commitments. There are two types of long term mitigation measures associated with the Vasco Caves Management Plan that are attributable to the LVP: cultural resources and biological resources-related commitments. The cultural resources-related measures result from caves' visibility to motorists on the new Vasco Road. (This road was constructed to replace old Vasco Road that is being inundated by the Los Vaqueros Reservoir). The proximity of the New Vasco Road to the caves is the reason for this site's acquisition by CCWD and EBRPD. The two districts jointly purchased the Vasco Caves site in recognition of the importance of permanently protecting this previously remote natural and archeological resource from trespassing, vandalism and other impacts.

The long term cultural resources associated measures derive from A) Mitigation 30 of the Final EIR on the Vasco Road Relocation (1990), and B) the Programmatic Agreement for cultural resources of the LVP. Measures identified with biological resources are implied through the LVP's permit conditions from the Fish and Wildlife Service's (FWS) Biological Opinions on Kit Fox (November 1, 1995) and Fairy Shrimp (August 7, 1995). Those measures pertaining kit fox requirements are specifically contained in the Habitat Management Plan attached to the Conservation Easement for the California Endangered Species Act (CESA), and in the CESA Management Agreement/Memorandum of Understanding with the Department of Fish and Game (DFG) regulatory programs for cultural and biological resources. What follows constitutes the complete set of mitigations that apply to Vasco Caves.

I. Cultural Resources Regulatory Program

A. Mitigation Measures. The following measure, i.e. Mitigations 30 from the Final EIR on the Vasco Road Relocation (1990), provides the framework for protecting the cultural resources of the Vasco Caves area. They are as follows:

Mitigation Measure 30. Purchase Property Where Cultural Resource Sites Are Located to Protect in Perpetuity.

Mitigation Program. CCWD will purchase lands, where appropriate, for significant and sensitive cultural sites to protect in perpetuity, such as the Vasco Caves. Permanent protection mechanisms, such as security patrols, restrictive barriers, or on-site caretakers will be used after purchase. The implementation plan will provide details for this mitigation measure.

Monitoring Program. The Program Manager will ensure that permanent protection mechanisms are carried out, as specified in the implementation plan.

Success Standard. Land is acquired and protection mechanisms provided, where necessary, to protect cultural resources specified in the implementation plan.

B. Implementation Program. CCWD is obligated to follow the process outlined by the Programmatic Agreement for complying with Section 106 of the National Historic Preservation Act. The Programmatic Agreement (PA) provides a management program for implementation by the agency which will be administering the Vasco Caves site, i.e. the Park District. The primary components of this program include the following:

1. Where practical and feasible, avoid adverse effects on cultural resources:
2. Coordinate plans and activities that may affect cultural resources with the agencies that are signatory to the PA through the Regional Archaeologist, Mid-Pacific Region, Bureau of Reclamation. The Bureau of Reclamation is the lead agency;
3. Protect sites from intrusion by human activities;
4. Mitigate adverse effects in accordance with the PA in those instances where such effects cannot reasonably be avoided;
5. Contact the County Coroner and Native American Heritage Commission if pre-historic human remains are encountered.

II. Biological Resources Regulatory Program

A. Kit Fox. The Park District shall follow the same prescriptions outlined for the Water District in the CCWD/Department of Fish and Game Management Agreement/Memorandum of Understanding (MA/MOU) for the conveyance and management of a Conservation Easement on 169 acres for the benefit of kit fox to satisfy both the federal and state Endangered Species Act obligations. These are provided by the Habitat Management Plan which is attached to the Conservation Easement (and serves as Exhibit B to the MA/MOU). These management practices are as follows:

Grazing Management

Grazing on HM lands will be managed to maintain and enhance San Joaquin kit fox (kit fox) prey populations, or prey base.

Maintaining the kit fox prey base will be achieved in part by leaving adequate amounts of residual dry matter (RDM) at the end of the growing season in October. RDM standards will be based on the U.S. Forest Service's range environmental analysis handbook (1984) for annual grasslands, as defined below:

Minimum Residual Dry Matter Standards by Slope Class for Annual Grasslands of the Los Vaqueros Watershed

<u>Slope</u>	<u>Pounds Per Acre</u>
Flat slopes (0-10%)	400
Moderate slopes (10-30%)	600
Steep slopes	800

NOTE: Standards represent moderate levels of forage use (US Forest Service, 1984)

Rodenticide Use

Use of rodenticide on all HM lands will be eliminated. Rodent control efforts will be focused only in localized areas where needed to avoid public health problems (e.g., bubonic plague transmission in high use areas) or to prevent damage to building foundations, roadways, and other facilities.

Control efforts will emphasize non-toxic means (e.g., trapping); where localized rodenticide use is required, the poison least toxic to non-target organisms will be selected. All rodenticide use will be conducted under the County permit system.

Maintenance and Encouragement of Perennial Grasslands

HM lands will be managed to actively increase the extent of native perennial grasslands.

Reasonably seek to enhance native perennial grasslands based on the U.S. Fish and Wildlife Service's (US FWS) opinion that this will improve habitat conditions for the kit fox. Enhancement of native perennial grasslands may include application of one or more of the following land management techniques in areas currently occupied by perennials or in adjacent lands dominated by annuals:

- modifying grazing intensity,
- altering the timing of grazing to reduce competition from annuals or encourage spread of perennials into areas dominated by annuals,
- controlled burning of perennial grasslands and adjacent annual grassland to decrease competition from annuals and encourage establishment of perennials, and
- seeding native perennials in areas dominated by annuals following treatment with the other techniques.

Permitted Activities

A variety of management and development activities have been explicitly recognized by US FWS and DFG as acceptable on HM lands. These are identified or referred to in the CESA MOU.

Plan Revision

This plan may be revised with the approval of DFG and US FWS.

Appendix H

The Resource Management Plan was prepared by Jocelyn Real, Park Planner, under the direction of Tom Mikkelsen, Assistant General Manager Planning/Stewardship, Design and Construction; and Maxine Turner, Chief of Planning/Stewardship. Project assistance was provided by Ray Budzinski, Range Management Specialist; Joe DiDonato, Wildlife Specialist; Josephine Orozco, Planning Technician; and Laura Boatman, Administrative Clerk.

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